Shetland Tweed: identification of its design aesthetic through the characteristics of traditional knowledge

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Submitted for the degree of Doctor of Philosophy

Heriot-Watt University
School of Textiles and Design
April 2021

ABSTRACT

Shetland tweed played a significant part in the Shetland Woollen Industry, competing successfully on a global stage, selling to the luxury tailoring market through the mid-20th century. However, its impact and influence was insufficiently documented to appreciate its key characteristics and design appeal, its tacit knowledge intuitive to traditional craft, and crofting cultures. This practice-based research, therefore, is a form of meta-design setting out to grasp the aesthetic qualities of Shetland tweed. It has mapped and made more explicit the tweed's particular characteristics as a set of principles for a contemporary cultural design context.

The author's practice, developed from a phenomenological position, related only to what was assimilated from Shetland: its environment, textile archives, museum collections and the nature of the indigenous raw material, Shetland wool. A constructivist grounded theory approach to data generation was adopted to inform a constructivist art methodology to the practical experimentation of knitting and weaving, demonstrating through this research process an experiential understanding of the subject and context.

In essence an aesthetic calculus was developed. It is effective in describing how a natural wool palette, particular to Shetland, has been used to produce tweeds that are traditionally Scottish but with aesthetic characteristics that are true to Shetland. This calculus has the potential to benefit manufacturers and designers who want to re-engage with Shetland tweed as a product grounded in the Shetland tradition of making textiles. The research methodology used also opens up the possibility to consider the aesthetic nature of a wider scope of similar textile scenarios where the natural wool palette has traditionally been a dominant factor.

New light was shone on the way one particular Shetland tweed manufacturer, T.M. Adie & Sons Ltd, repurposed local textile knowledge to interpret tweed designs. This interpretation represents a form of cultural design activity and is an exemplification of an evolutionary process of safeguarding intangible knowledge rather than being an example of traditional craftsmanship as perceived by Intangible Cultural heritage.

Acknowledgements

I would like to thank Ms Sarah Tailor for securing AHRC funding for this practice-based PhD research in collaboration with ASF Shetland and Andy Ross at ASF Shetland for organising my accommodation on Yell and generously introducing me to the Shetland textile community during my field trips. Thank you to Heriot Watt University and the supervisors appointed who gave me their insight into research practice at various stages of my studies: Prof Robert Christie, Prof Pam Schenk but most particularly to Dr Danmei Sun for her unwavering encouragement and focus to see me through to completion.

A very special thank you to Dr Carol Christiansen, curator for the textile collection at the Shetland Museum and Archives, who not only provided me with access to the T.M. Adie & Sons archive collection on a number of occasions but also shared her expertise to discuss its contents. Thank you too to the staff who run the archives search-rooms at the Shetland Museum and Archives for being so accommodating with all that I requested to look at each visit. My warmest thanks to James and Anne Adie who I met in Voe early on in the research to discuss their time at T.M. Adie & Sons.

Thank you to Janet Shelley for teaching me to weave in her studio in Fife and to ASF Shetland for providing me with the workshop environment to produce my woven samples.

Most importantly, I would like to thank my family and friends for their continued support throughout this research.

DECLARATION STATEMENT

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GLOSSARY

action-led cycle, the phases the research took

AVL looms, full-size loom with 24 shafts, can be mechanised

catalogue, a repository for this research into which went groupings of visual material called categories, stored in a digital format

catalogue context, contains all visual material relating to ‘C Archive TMA

catalogue inspiration/context, contains all visual material relating to ‘B1/B2 collections’

catalogue inspiration, contains all visual material relating to ‘A Landscape’

category, a grouping of visual material

claith, old Scots meaning cloth, usually plain woven

clusters, groupings of methods through the research

context, collection of writing relating to ‘B2 collections’ and ‘C Archive TMA’

descriptors, codes in this research that described impressions drawn from within each piece of visual material

factors, codes in this research that named objects or facts directly drawn from within each piece of visual material

gaulmogit, pale grey

hap shawl, Shetland shawl, mid-weight, handknit integral square, folded to a triangle to wrap around the shoulders.

Harris loom, tabletop wooden framed loom with four shafts appropriate to weave 2x2 twills samples woven to 15” inches

Hattersleys, narrow width power looms driven by pedals

homespun, handspun yarn, handwoven in the highlands and islands

inquiry, an avenue of study in this research

Inquiry 'A Landscape', an avenue of study in this research into Shetland's open landscape/environment

Inquiry 'B1 Collections', an avenue of study in this research into objects/items the author collected within Shetland's open landscape/environment

Inquiry 'B2 Collections', an avenue of study in this research into the textile and related heritage collections across the Shetland Heritage museums

Inquiry 'C Archives TMA', an avenue of study in this research into T. M. Adie & Sons archive material

Inquiry 'D Making', an avenue of study in this research into the activity of construction through practical studies

inspiration, collection of writing relating to 'A Landscape' and 'B1 collections'

katmollet, light grey

kishie, Shetland handwoven baskets

make, name given to a practical study in this research

making, activity of construction through a practical study in this research

matrix, tabulation of data that can be cross-referenced on a grid layout

matrix T, correlation of colours used across a group of TMA range cloths

matrix U, correlation of factors and descriptors used in a focused group of categories

matrix V-Z, correlations of visual and written documentation collected in matrix U through the factors and descriptors

moorit, brown

mooskit, dusk

outcomes, practical studies/archival material/organisational work

pick, row of weaving

range card, woven design for a range cloth documented with all the technical details including the colourways

range cloth, a 2x2 twill design tested through twenty-five possible colour variations

range file, collection of range cards, stored in numerical order

rooing, hand pulled wool of the back of Shetland sheep

sett, the relationship between the yarn and the quality or drape of the cloth it makes

shaela, mid-grey

Shetland black, dark brown

Shetland white, cream

sholmit, beige/fawn

sub-category, subjects within a single category

trial, initial woven design ideas to define possible range cloths

Unst, the most northerly of Shetland's Islands

wool clip, fleece shorn off the sheep's back

woollen, shorter fibres from wool spun to a coarser finish

worsted spun, longer fibres from wool spun to a smoother finish

Yell, Shetland Island north of Shetland's mainland

ABBREVIATIONS

ASF	Ann Sutton Foundation, Shetland
CAT	category
EW	J&S extra-fine weight yarn
EPI	in weave: ends per inch to measure the width when warping up
ICH	intangible cultural heritage
J&S	Jamieson and Smith, wool brokers
JW	J&S jumper weight yarn
MWN	mixed with natural
NASWM	National Association of Scottish Woollen Manufacture
OS	observational study
PH	photographic record
PPI	in weave: picks per inch to measure the length when weaving
PSM	primary source material
RJ	reflective journal
SLD	Shetland shades
SM store	Shetland Museum store
SMA	Shetland Museum and Archives
SWI	Shetland woollen industry
TK	traditional knowledge
TM	Textile Museum
TMA	T. M. Adie & Sons Ltd, Voe
UHC & BH	Unst Heritage Centre and Boat Haven

Chapter 1 – Introduction

1.1 Background

This PhD study started from a collaborative proposal between the School of Textiles and Design at Heriot Watt University and ASF Shetland (ASF), originally the Ann Sutton Foundation, which had moved to the island of Yell in Shetland under new management in 2007. ASF Shetland specializes in weave, weave residencies and woven products through collaborative ventures. The type of PhD initially proposed was to be collaborative and practice-based within the context of design research. The remit was to study the Shetland textile heritage with the aim of producing commercial outcomes for the Shetland textile market. The main funding came from the AHRC in the form of a collaborative doctoral grant, Heriot Watt University accommodated the PhD and ASF Shetland provided the research environment in which to conduct fieldwork.

After graduating from Kingston University with a BA in Fashion Design and from Central St Martins with an M.A. in Fashion Knitwear Design, the author embarked on a career as a knitwear designer in the luxury fashion market, designing, developing and in some cases making knitted items by hand or machine for commercial companies and private clients. Academic credentials and practical experience combined to provide the author with the necessary qualifications to undertake both archival and literature research as well as the conduct of collaborative work at ASF Shetland with local designers.

1.2 Research problem

Preliminary archival research emphasised the degree to which the Shetlands are famous for their iconic group of traditional textiles, predominantly Fair Isle knitwear, plain knitwear and knitted lace, but most significantly to this research, included in this group is Shetland tweed. The earlier version of Shetland tweed was a hand-spun, handwoven cloth known as ‘claith’ and later as a ‘homespun’ (Christie, 1958) characteristic of the cloths woven across the Highlands and Islands of Scotland. Shetland homespun only really evolved to become production-viable tweed from the 1920s through to the 1980s (Christiansen, 2010) and so joined an already established collection of Scottish tweeds (Costin, 1967). Ultimately, and crucially, what these Shetland textiles had in common was their raw material: Shetland wool rooed (originally hand-pulled rather than shorn) from the sheep grazing across Shetland. Any variation from this combination could not

produce, ‘the outstanding softness of handle that was, and is, the basic feature of the native wool.’ (Ponting, 1987, p.86)

These textiles, only really documented since the 1800s, still have sufficient integral coherence for their particular qualities to be identified and celebrated, exemplified in the popularity of Shetland’s textile festival Wool Week, already into its tenth year. However, Shetland tweed has consistently failed to match the reputation and manufacturing success of Shetland knitwear, despite having once had a reputation as a luxury tailoring cloth, exported internationally in the post-war era.

The early collaborative practical work set in motion two pilot projects based at ASF to test the feasibility of conducting design projects with commercial woven outcomes inspired by Shetland’s textile heritage. These projects were called ‘Limited Edition’ to emphasise the probable small production runs, and to test the potential desirability of the products. The author set a brief for each of the pilots to relate to the author’s developing understanding of the research environment. The two local weave designers involved responded each to a brief and produced outcome accordingly. These pilot studies, characteristic of a classic design and sampling brief in the context of industry, proved insufficient and too open-ended in the context of research. The experience emphasised the degree to which familiarity with Shetland’s traditional textiles as inspiration had greater influence on the Fair Isle and lace knitting than on woven Shetland cloth as a tweed. These early pilot projects contributed towards reframing the research question from testing the feasibility of design projects with commercial outcomes to questioning whether Shetland tweed’s aesthetic had something to contribute towards Shetland’s textile heritage.

One conclusion from the indeterminate outcome of the pilot projects was that the development of woven ideas produced on Shetland was actually encumbered by the particularity of these traditional knitted designs and the raw material. Nevertheless, there remained the design aesthetic of Shetland tweed, a description of which referred to its ‘distinctive qualities’ (Society of Shetland Crofter Weavers Ltd, 1946) intimating an idiosyncratic nature. Extensive examples of tweed were readily available in the textile archives at the Shetland Museum and Archives based in Lerwick, courtesy of a significant donation of business and manufacturing material covering ninety years through the 1900s belonging to T. M. Adie & Sons (TMA), who produced Fair Isle, knitted jersey and Shetland tweed throughout that period. The author was confronted by a surprising paucity of documentary material to examine on the output of the

manufacturers of tweed in Shetland other than that provided by the TMA archives. Nevertheless, these archives were full enough of detailed schemes, patterns, and colour coding to satisfy the author that confidence could be placed on their representative function. These archives also allowed such examples of design process to be re-experienced and set against the intuitive and intangible context.

Would it be possible therefore, through the examination of such a traditional textile and through practical experiment, to identify these implicit distinctive qualities as component parts or a set of principles, part of a system of working or a form of design thinking? In so doing, could these components be carried forward explicitly through the design process to contribute traditional knowledge in a more structured and lasting way, rather than as mere inspiration?

Cultural heritage interpreted through traditional made textiles – in this particular practice-based thesis Shetland's textile heritage - was the basis of inquiry for this research. It was conducted through the paradigm of design research 'through' practice (Frayling, 1993; Yee, 2010) where practice was conducted not as applied theory but instead as part of a dialogue with a theoretical context making the activity of practice more explicit (Findeli and Bousbaci, 2005).

The literature initially followed an original proposal set out by Bruce Archer and Nigel Cross who called for design research to be a discipline in its own right because of its 'designerly way of thinking and communicating' (Archer, 1979) and its designerly way of knowing' (Cross, 1982). This proposal subsequently drew attention to traditional knowledge as a precursor to design knowledge (Cross, 1990； Broadbent, 2003) and the intuitive and tacit nature of craft activity (Dormer, 1994).

The significance of Shetland wool from the Shetlands directed the thesis towards examining theoretical ideas concerning impact of environment on creativity and thus intrinsically on the manufactured product. The premise was that an artefact made out of its environment is a form of knowledge (Ingold, 2013).

Parallels have therefore been made between traditional knowledge as a form of design knowledge and an artefact as both an expression of traditional knowledge and its own environment. These parallels have been drawn together by an overarching philosophical position found in phenomenology that has unified the ontological, epistemological, and methodological approaches in line with the design research perspective. This

philosophical position located the research specifically to Shetland enabling the focus of the research to stay within the experiential parameters of Shetland's environment.

There is a dichotomy between traditional knowledge passed on through artefacts as an expression of a community and heritage connotations associated to a product in promotion of a cultural identity. The first is a form of knowledge transfer within its context and the second is as a result of a particular perspective on a context. Heritage connotations assimilated into commercial products, places or events are bound by temporality and are subject to change because of the relationship the present has with the past (Harvey, 2001). This suggests that traditional knowledge is on a linear trajectory whereas heritage connotations are on a moveable trajectory. It is for this reason, as this is practice-based research, that the thesis has followed the path of traditional knowledge as a precursor to design knowledge, in order to focus the investigation on the aesthetic nature of Shetland tweed and not on its potential for interpretation. The problem it would seem from an ethical perspective therefore is with cultural appropriation while maintaining respect for that culture's traditions (Appiah, 2016); a problem the Shetland textile industry has experienced on many an occasion. There have been examples of jumpers made for the fashion industry that have been advertised as Fair Isle, when their resemblance to how traditional Fair Isle is knitted, or recognition of a Shetland crafter's understanding and interpretation was perfunctory (Carden, 2018).

1.3 Aims and objects of the research

The aims of the research are:

- to understand what kind of traditional knowledge might have contributed to the design aesthetic of Shetland tweed; and
- to consider whether Shetland tweed's design aesthetic can be broken down into component parts or a set of principles (to inform a cultural heritage/design context).

The specific objectives of the research are:

- to experience and explore Shetland's environment as a context to Shetland tweed;

- to explore Shetland's cultural heritage museums to contextualise Shetland tweed;
- to study archives relating to the manufacture of Shetland tweed to focus and reference the research to inform practice;
- to study and experience through practice the design qualities of Shetland's indigenous wool; and
- through practical methods of making, develop an understanding of Shetland tweed's aesthetic construction.

1.4 Layout of Thesis

Following this chapter, Chapter 2: Literature Review looked at four key areas relevant to the research, which have covered the following paradigms: design research, craft research and cultural design within intangible cultural heritage (ICH):

- the aesthetic nature of Shetland tweed in relation to Scottish tweed, Shetland woollens and Shetland wool;
- the nature of traditional knowledge (TK) in relation to indigenous artefacts and the communities that make them;
- the philosophical position of design phenomenology and phenomenological perceptions of environment; and
- research examples that have diagnosed and made more explicit the intangible nature of TK to work with it in a design related context.

Chapter 3: Methodology, Research Structure and Methods is divided into three sections. The first section discusses the methodologies adopted and how they worked together through the research. These methodologies were:

- Constructivist grounded theory
- Constructivism as discussed in art theory
- Reflection in practice: reflection in action and reflection on reflection in action

The second section describes the structure the research took using the dialogue between reflection in action and reflection on reflection in action to illustrate the pattern of work that developed. This was illustrated through the inquires that took shape, which were alphabetized. The first three (collectively named exploratory), 'A Landscape' (Shetland's environment), 'B1/B2 Collections' (in the museums or from the landscape)

and ‘C Archive TMA’ (documentation of the T.M. Adie & Sons tweed samples) were discussed in relation to the fourth inquiry of practice labelled ‘D Making’.

The third section lays out the methods applied through the research:

- reflective journal as a reference tool;
- visual documentation: photography; drawing;
- visual documentation as a reference tool organised into a series of catalogues (CAT) numbered 1- 11, digitally stored;
- interviews;
- the process of coding (adopting a constructivist grounded theory approach) and the assigning of codes to the catalogues of visual material, digitally stored;
- the fourth inquiry into making: knitting and weaving discussed through tools, techniques, and material; and
- use of matrix to support two tasks:

  1) reviewing the visual documentation, through the sifting of the assigned codes in reference to the practical work,

  2) making more visual a specific production period of TMA tweed in reference to colour selection in the sampling phase

Chapter 4: Conduct of the exploratory inquiries lays out the focus of the research in three areas of study labelled in the following way:

- Inquiry ‘A Landscape’/CAT 1 (Visual documentation of Yell)
- Inquiry ‘B1/B2 Collections/ CAT 7 (visual documentation of collections in the museums and collected items from the landscape)
- Inquiry ‘C Archive TMA/CAT 8 (visual documentation of tweed samples)

Chapter 5: Conduct of Inquiry ‘D Making’ is divided into five practical studies. Each practical study covers the process of making through the techniques of either knitting or weaving as an investigation in relation to the various levels of understanding drawn from the exploratory inquiries.

Chapter 6: Inquiry ‘C Archive TMA/ CAT 11 (use of colour in the TMA sampling process 1957-196). This chapter analyses in more detail how colour was used while sampling tweed design ideas to develop tweed collections for customers.

The final Chapter Conclusions and Future Work provides the main findings of the research, identifies the limitations, and lists recommendations for future research.

Chapter 2 - Literature review

2.1 Introduction

The literature review looks at four key areas relevant to the research which cover the following paradigms: design research, craft research and cultural design within intangible cultural heritage (ICH):

- the aesthetic nature of Shetland tweed in relation to Scottish tweed, Shetland woollens and Shetland wool;
- the nature of traditional knowledge (TK) in relation to original artefacts and the communities that make them;
- the philosophical position of design phenomenology and phenomenological perceptions of environment; and
- research examples that have diagnosed and made more explicit the intangible nature of TK to work with it in a design related context.

The review starts by looking at the literature regarding the aesthetic qualities already attributed to or in relation to Shetland tweed. This includes looking at the broader field of Scottish tweed, Shetland wool and Shetland knitted textiles. It also looks at how Shetland tweed might be perceived in the context of ICH.

The section that follows considers the different connotations of TK within an indigenous community. A definition of the artefact is discussed as a form of experience through the structure of that experience and how it relates to design knowledge. It continues to discuss phenomenology as a philosophical perspective from which to appreciate the process of making an artefact within an environment that is self-sufficient and bound by traditional roots. Concepts of place and landscape are discussed also from a phenomenological perspective to consider the intrinsic relationship that exists between people, place and craft related artefacts.

The final section looks at different research approaches taken to diagnose and transfer traditional knowledge implicit in craft related artefacts and their communities for safeguarding, for evolutionary purposes or for a redesign or re-contextualisation. This leads on to the concluding section summarising the main points from the review and laying out the gap in the literature.

2.2 What is the aesthetic nature of Shetland tweed?

In order to answer this question a review of the aesthetic qualities of Scottish tweed, then Shetland tweed, Shetland woollens and Shetland wool establishes the context in which Shetland tweed evolved from homespun to become an exported manufacturing concern during the 1900s. Then it examines the paradigm of intangible cultural heritage in Scotland as a way of perceiving the craft of Shetland tweed and thereby what kind of traditional knowledge it might have to offer in today's global outlook.

First, there needs to be clarity around what is meant when a cloth is described as tweed, a term that originates from the 1830s as a derivation of *tweels* or *tweelds,* which were earlier descriptions of the cloth (Anderson, 2017, p.9). A particular term 'design of the cloth' (Ponting, 1987 p. 78) has been used since the early 1800s to describe the combination of different colours in a yarn across a warp and weft (Watson, 1954). In particular, this combination of elements proved most effective in a cloth woven in a 2x2 twill, which provided the opportunity to use colour to define pattern in bold or subtle ways. Due to having to plan the set-up of each coloured yarn before weaving commenced, the skill lay in the knowledge developed to understand how colour behaved (Gulvin, 1973, p.75) through the various permutations of the 2x2 twill. Such a skill, as Ponting (1987, p. 81) noted, was particular to the Scottish manufacturers and their sampling teams. A final element, crucial to why tweeds could vary so distinctly by the character of their textural quality, was the use of woollen spun yarn. There was no prerequisite as to which wool to use, which opened up the diversity and quality of the tweeds we are familiar with today. The author therefore has considers the 'design of the cloth' in the context of this research through these three elements, use of a woollen yarn, use of colour and the combination of these both through the construction of a 2x2 twill.

2.2.1 Scottish tweed: a general overview of 'the design of the cloth'

Over the last seventy years a certain group of authors have discussed Scottish tweed from this perspective of 'the design of the cloth' (Anderson, 2017; Ponting, 1987; Gulvin, 1973; Stillie, 1970; Harrison, 1956). Amongst these authors, Harrison is the only one who was an active member of the Scottish manufacturing community, and his writing on the subject of Scottish tweed was an expression of his passion for the tweed produced at Johnstons of Elgin, where he was managing director. Harrison was a member of the National Association of Scottish Woollen Manufacturers (NSAWM),

and between November 1931 and February 1956 he wrote and edited on behalf of this association a series of short essays about different aspects concerning the Scottish tweed industry and the tweed cloth. His work, originally published as leaflets to inform the industry community, attracted interested parties in government departments, libraries, and universities. Though subjective in their perspective at times, these published works are valuable sources providing insight into the efforts made by the manufacturers in the production of tweed during the pre and post WW2 period.

These authors were all in general agreement concerning the development and structure of tweed which became fashionable and desirable by the early 1800s due to the shepherd check pattern. This pattern took advantage of the contrast between the two natural shades, light and dark, sorted from the fleece of the indigenous sheep. The skill of the designers at the time mixed these two shades with dyed colours using the simple 2x2 twill weave structure. This developed the multitude of patterns made up of stripes, checks, over-checks and herringbone effects. An offshoot of the tweeds became known as the district checks, developed in collaboration with estate landowners to provide distinguishable clothing for their workers on the estate. These more specific designs adopted names such as Glen Urquhart, Coigach and Gun club Check (Anderson, 2017; Ponting, 1987; Gulvin, 1973; Stillie, 1970; Harrison, 1956).

There were however different perspectives on what may have been the more dominant factor contributing to the tweed's Scottish character. The following quote is an initial open-ended and non-commital account of what Scottish tweed was, or rather was not,

> 'Tweed could perhaps be described rather than defined as a cloth of medium weight, best adapted for suits for men and women. Not very smooth in texture. Tending, but only tending, towards Cheviot qualities. Tending, but by no means limited to broken effects of colour, attained either by pattern or by blends of colour; quite definitely limited to wool spun on the Scotch system – that is, woollen, not worsted yarn. It should show that slightly rough surface and that kind of broken or varied colour that is more suited to informal use….' (Harrison, 1956, p. 150)

This quote from Harrison paints a picture of the diversity of qualities within the category of tweed, coming out of Scotland. This starts to suggest that a sense of the character of the cloth was required to recognise and appreciate its varied qualities in the same way that a red wine is sampled for its diversity.

Stillie (1970) chose to focus his attention on the development of the tweed patterns through the 1800s. A conclusion of his work was the degree to which the designers worked well with the wool merchants to develop cloths in line with the growing market for tweed. This illustrated the adaptability of the manufacturers to develop tweeds for a fashionable market providing variety and small production runs.

Gulvin on the other hand concentrated his discussion on the use of colour. He explained how the interest in colour enabled the development of methods of spinning dyed wools, which produced three types of coloured yarns for weaving. These were coloured twist effects, marl effects and mixtures. In particular, the mixtures contributed to the development of the district checks, with the most distinctive named after the landowners that involved themselves in the design of such Scottish colours like Lord Lovat who commissioned lovat mixture (greens-blues) and Lord Elcho who commissioned the Elcho mixture (khakis-browns-reds). Gulvin (1973) stressed that the inspiration for these mixtures came from the landowners' lifestyles, which were immersed in the Scottish landscape due to their activities of hunting, farming and fishing. These mixtures were the precursors to camouflage clothing and army uniforms.

Ponting's concluding focus was on the ability of the Scottish manufacturers to work first with their native wool to produce a high quality cloth and then with rare wools from abroad to produce luxury cloths. He described how the Scottish textile industry was 'topographical[ly] spread' (1987, p. 88) across mainland Scotland and up to the Highlands and Islands, covering a variety of sheep and their wool: Blackface, a mountain breed, Cheviot, a hill sheep, Northern Cheviot, and Shetland sheep. The rare wools from abroad included Southdown from England and Merino from Australia and New Zealand, which made the tweed quality Saxony. The luxury cloths were made from wools from the Himalayan goat, producing cashmere and cashmere spun with lambswool and, to a lesser degree, the South American llamas producing alpaca and vicuna. He argued that the strength of the tweed designs and their recognition internationally was due to the skill of the wool manufacturers in achieving a perception of luxury in the cloth across all these wool varieties (1987).

Anderson (2017) wrote an extensive historical review of tweed, its evolution, use in sportswear and fashion and how it is perceived today. She identified the different categories of tweeds across the British Isles, each with their own characteristics, echoing Ponting's point that tweeds come in a variety of qualities. However, her emphasis was on the idea that the qualities 'have strong connections with specific

places or landscapes, and with notions of Scottish, English, Irish and British identities' (2017, p.7) which she illustrated through the names of the tweeds 'Saxonies, Cheviots, homespun, Harris, Donegal, Shetland, West of England, Welsh, Estate and Yorkshire cloths' (2017, p.7). Scotland can lay claim to six of these ten tweeds listed above: Saxonies, Cheviots, homespun, Harris, Shetland and Estate, emphasising the diversity of tweeds found across The Borders, on the west coast and up into Aberdeenshire and the Highlands and Islands. The term homespun originated from the crofting communities in the Highlands and Islands of Scotland in the 1800s and early 1900s to describe a tweed handwoven by yarn that had been hand spun. More often than not homespun included Harris and Shetland tweed woven during this period. Through the 20th century the term was stretched to cover tweeds that had just been handwoven or had the effect of a home spun (Ponting, 1987; Anderson, 2017).

This section of the review has outlined that tweeds in Scotland were a diverse range of high quality woollens that evoked their origination through colour and texture. What connected all these tweeds was the simple 2x2 twill. What created their diversity was the re-interpretation of the 2x2 twill due to the variety in woollen spun yarns. The following section reviews how Shetland tweed was perceived within this context of variety and diversity.

2.2.2 Shetland tweed: a sense of its 'design of the cloth'

Crucially there is no overriding piece of literature specifically on Shetland tweed, so an initial historical review was undertaken to piece together the Shetland tweed story through the 20th century (Dearlove, 2013; Appendix A). The terms Shetland woollen industry (SWI) and Shetland wool draw up a variety of sources: government reports, theses, journal articles, fashion and marketing press, the majority of which cover the period post WW2 to the present day. Shetland tweed proves to have been very much at the mercy of and entwined with both search topics.

The government reports (Calder, 1945; Winterbotham, 1955; Grieve, 1970; Wilcox, 1984; Marr and Scott, 2012) were commissioned to assess and advise on the future of the SWI as a whole after WW2 and intermittently through to the present day. The SWI covered the manufacture of all woollen goods made in Shetland using predominantly Shetland wool sourced from Shetland. Plain and Fair Isle knitwear, knitted goods, and Shetland lace were the mainstay of this industry but included Shetland tweed and woven goods, such as blankets and dressing gowns. These reports were published at intervals

over a sixty-seven year period and therefore provide a good overview of the changing perceptions of the Shetland tweed industry within the SWI.

The Calder report, commissioned by the Scottish Council on Industry, was published in 1945 to examine the Scottish woollen industry in the Highlands and Islands as part of the WW2 reconstruction initiative. In the section on Shetland, it acknowledged the industry's ambition to buy fifty looms to expand tweed production and provide employment, recognising its success selling into the fashion industry nationally and internationally (Calder, 1945, p.35).

Eight years later a textile expert, Winterbotham, was commissioned by the Government to report on the organisational structure of the SWI (Smith, 1958). Concerning the industry as a whole, the report stressed the importance of producing quality woollen products for the luxury market to justify the high production costs. However in support of the manufacture of tweed on Hattersleys and handlooms, Winterbotham urged for investment to enable expansion, especially as the main market had now become the USA claiming the aesthetic nature of the woven cloth was of a very high standard (Winterbotham, 1954, p.4).

The positive tone and supportive attitude to Shetland's tweed had dramatically changed by the 1970s, evinced by a subsequent report on the Shetland woollens published in 1970. It claimed not only that the production of tweed had become very low, but that a more serious issue was facing the tweed industry: an ' apathetic attitude (except for one or two manufacturers) to possibilities for expanding manufacture and sales of Shetland tweed' (Grieve, 1970, p.1).

The deterioration of support for the tweed continued into the 1980s. The Wilcox report, which was predominantly about the Shetland knitting industry, explained that '…there is no analysis of hand-woven cloth… which has declined as a satellite operation in recent years…' (Wilcox, 1984, p.4)

Finally, what was once known as the SWI was instead being termed the Shetland textile sector, the title of a report which came out in 2012. This report identified only two significant manufacturers providing facilities for knitting, spinning and weaving. Otherwise, 70% of the textile industry was made up of micro businesses, demonstrating a radical change in the balance between manufacturing goods and crafted goods. 38% of these micro businesses used weaving looms, and 40% of woollen goods produced were woven. Crucially, there was no specific reference to tweed or Shetland tweed through

this most recent report, instead it referred only to the use of looms and woven goods (Marr and Scott, 2012).

The picture painted by the succession of reports points to an industry under the pressures of a changing economic landscape a dilemma that affected all Shetland industries between WW2 and 1969 (Donald,1983). Circumstances pertinently out of the SW1's control, namely the USA embargo in 1956 on British woven goods and a failure to maintain a valid trademark for Shetland tweed across the industry, contributed to hindering Shetland tweed's progress in a competitive market (Dearlove, 2013). Over time, this, combined with the cultural shift in the industrialised production of luxury woollen goods more globally, has made Shetland tweed the rare commodity it appears to be today.

However, further literature shines a light on the characteristics and quality of the tweed recognised by Calder and Winterbotham, the earliest of which was published in 1929. Here Shetland tweed was included in a chapter called 'Homespun Tweeds' in a biography about the Scottish borders tweed manufacturer Henry Ballantyne & sons (1927). In this passage Shetland tweed is singled out against Harris tweed suggesting that 'to possess a real Shetland tweed or costume is distinctly a luxury' (1929, p.79). In relation to this specific quote the author came across a typed essay about homespuns with special attention made to Shetland tweed (Unknown (a), circa 1930s). It was clear that a significant part of this essay had been copied from the passage that was found in the biography of Henry Ballantyne & sons (or vice versa), and therefore was relevant due to its specific descriptions of Shetland tweed's characteristics although the authorship is unstated,

> 'The wool of the Shetland sheep is never dyed, but the various natural colours – i.e. natural coloured fawn; moorat, a warm golden brown; brown; a rich dark shade, and grey- are carefully sorted and used to best advantage in the design……The real Shetland tweed, made from pure Shetland wool, can be recognised by its softness and fullness of handle, combined with its lightness and warmth. The supply is naturally restricted. White and natural coloured Shetland tweeds are popular and the classic weaves in these colours are always in demand. Sometimes the natural colours are combined with softly blended overchecks and stripes; occasionally there is a demand for brighter shades together with novelty weaves and designs…. Despite its delicate appearance it is remarkably hard wearing and warm'. (Unknown (a), circa 1930s)

The use of the word ‘real’ and ‘pure’ suggests a validity to the Shetland tweed quality being described that must have been undercut by poorer examples made outside Shetland (Irvine, 1953). The following literature, covering what was written post WW2 has considered this perception of validity but is mixed in an understanding of what made Shetland tweed. One can’t fail to notice the change in perspective, this time over an eighty-eight year period.

Parallel to the Calder and Winterbotham reports, a small group of theses, papers, and articles, discuss different aspects of the Shetland woollen industry. These papers were written during a concentrated period between 1953 and 1959 when Shetlanders experienced a post-war boom in its woollen industry despite being impacted by the 1956 USA embargo on woollen goods. Across these sources there were conflicting views regarding the quality of the tweed cloth. Woods in her paper, ‘Study on the Shetland wool-growing and hosiery industry’ stated that,

> ‘…contrary to what has been written, Shetland tweeds when woven of handspun yarns, wore very well indeed. The opinion that Shetland wool is too soft to be strong and hard wearing is not true of well hand spun yarns.’ (Woods, 1953, p.8)

Jenkinson, on the other hand, lacked any confidence in the quality of the tweed, claiming in his dissertation on the economic geography of the SWI that,

> ‘Shetland wool combines great warmth with extreme lightness. The yarn is strong, extremely soft and has a silk-like sheen. Against these qualities must be set the disadvantage that applies to garments in Shetland tweed. The softness of the wool and the loose texture of the weave mean that garments lose their shape far more rapidly than those in other wools.’ (Jenkinson, 1959, p.7)

Woods and Jenkinson’s views, though opposed and five years apart, were drawn from their own research travelling round the Shetlands and talking to the woollen industry. Woods was specifically writing about handspun wool and Jenkins about the finished garment; however, the disagreement is in whether the wool could make a quality tweed at all. This possibly suggests that in Shetland during the 1950s and early 1960s the Shetlanders were divided in their opinion of Shetland tweed and support for its future. Smith, a significant member of the Shetland community at this time, took an optimistic and understandably biased view of this future. In his article ‘Shetland Sheep and Shetland woollen industry part II’ he wrote in reference to the USA embargo on

Shetland tweed that it was, '…a speciality, [and] will find an expanding market…possessing all the advantages of Shetland wool for warmth, lightness and exquisite blends of natural colours". (1959, p.18)

Smith's description here is in the same vein as the previous quotes on Shetland tweed describing it as a homespun, extoling the characteristics of a lightweight cloth and particular blends of natural colours. A later classification was found in the SWI Special Report 4, 1970, which referred to Shetland tweed as traditional and added the description simple weave to this list of characteristics (Grieve, 1970, p. 20). In using the word 'traditional' to encompass the tweed's characteristics, it has evoked a sense of the tweed's passing out of the 1960s as a contemporary fabric, developing a distance between the observers of the industry and those engaged in it.

This disengagement is further illustrated by Anderson's classification of Shetland tweed, the most recent to date, that suggests that the tweed tended to be woven in plain weave from the wool's natural colours (2017), implying that it was rarely woven in the signature 2x2 twill. Despite this rather simplistic description, Anderson acknowledged the luxury qualities the Shetland wool brought to the cloth (2017).

In summary of Shetland tweed's characteristics through this literature, the earliest description recognised the use of 'classic' tweed pattern constructions, otherwise a later more general view simply referred to the tweed patterns as 'simple' or 'plain', narrowing the expectation of what might actually have been woven. The importance of the natural shade colours from the wool continued to be a relevant factor throughout. As for the textural quality, this has been subject to whether the Shetland wool was a viable yarn to weave a luxury cloth at all, especially considering its' description as being lighter than other tweeds and with a lightness to handle.

Shetland tweed was by no means an isolated product, as the majority of the woollen goods in Shetland were made from the indigenous wool. Further understanding about other aesthetic aspects of some of these woollen goods as well as the wool itself would help to widen the context in which Shetland tweed was made.

2.2.3 Shetland's knitted textiles: a review of the design aesthetic

A deeper sense of the indigenous design context in which Shetland tweed developed as a manufacturing concern during the 1900s entails a review of the literature covering Shetland's knitted textiles Fair Isle and lace. There are two distinct perspectives: one

historical and one that of a crafter. The historical perspective looks at the role and importance of hand knitting to Shetland women and to the livelihood of crofting and at the impact, influence and desirability the knitted pieces had in the fashionable market place from the 1800s to the present day (Bennet, 1987; Fryer, 1995; Abrams, 2010; Sinclair, 2011; Chapman, 2013; Laurence, 2013, Davies 2016). The crafter's perspective looks at the technical construction of these knitting styles, offering advice and guidelines to the reader in how to knit and interpret them through appropriate use of yarn, pattern and colour (Smith and Twatt, 1979; Don, 1979; Smith and Bunyan, 1991; Noble, 2002; McGregor, 2003; Millar, 2006; Starmore, 2009; Macgregor, 2009; Jamieson & Smith, 2011; Davies, 2016).

This second viewpoint covers predominantly Fair Isle knitting, the more popular of the two knitted textiles for crafters to practice. Across this literature is established a brief historical context, otherwise what is predominantly discussed is the approach taken to produce a Fair Isle knitted jumper. The following 'rules of thumb' to construct a Fair Isle pattern have been summarised from these sources and are listed below. This is useful from the point of view of colour and pattern construction, especially as the majority of the larger tweed manufacturers on Shetland also produced Fair Isle products (Jenkinson, 1959; Grieve, 1970).

- each knitted row has two strands of colour;
- patterns are symmetrical and made up of odd rows;
- all patterns contain diagonal lines;
- patterns are either made of bands of small motifs or are bolder in size and known as all-over patterns;
- colour change fits around symmetry of pattern;
- an odd numbered symmetrical pattern allows for the central row to be strongly coloured with the colour/pattern use mirrored either side;
- shading is used moving across the light to dark spectrum and back again.

(Smith and Twatt, 1979; Smith and Bunyan, 1991; Mcgregor, 2003; Starmore, 2009; Macgregor, 2009).

A repeating factor coming out of these craft-based sources is the encouragement to the reader to knit colourful Fair Isle. The original palette that was utilised by the Shetlanders was the palette of natural shades supported by just four dyed colours:

madder red, indigo blue, onion gold and green (Johnston 2013). This palette adapted and evolved into and through the 1900s due to the skill of the knitters, modern dyes and the whims of fashion.

2.2.4 The Shetland wool quality and its natural shade colours

The quality of the Shetland wool is unique (Seymour, 1953; Smith, 1958; Grieve, 1970; Ponting, 1987; Christiansen, 2013). It is made up of two opposing fibres, one is coarse and the other is fine. These are mixed together in the fleece and are most easily sorted out by hand (Henry, 2013). It is generally woollen spun and can be recognised by its slight sheen, soft fuzzy appeal, and spongy lightness to handle (Christiansen, 2013). 'Its touch is curiously soft and silky, reminiscent of fine alpaca, or even Chinese cashmere-much softer than its appearance suggests' (Harrison, 1956, p. 55)'.

However, the main problem within the woollen industry has been to control its purity, due to cross breeding in the Shetlands of the Shetland sheep with Blackface and Cheviot (Seymour, 1953; Smith 1958; Grieve, 1970; Christiansen, 2013). Its exclusivity is due to its low yield in wool from its fleece compared to the other two main breeds of sheep on the Islands. A trademark to control this issue has been problematic throughout the 1900s because those in the SWI and those working with Shetland wool outside the Shetlands in the rest of the UK were unable to agree on the terms of the trademark.

The Shetlanders wanted exclusivity of the name to cover all woollen goods in Shetland. Initially a trademark was set up in the 1930s for the knitters and then again, in 1947 for the knitters and weavers. However, this was dependant on producers using the trademark responsibly (Smith, 1958; Grieve, 1970). Weavers could only use the trademark if the yarn they were using had 50% or more Shetland wool in it (Jenkinson, 1958).

There are crofters today, particularly concerned with the pedigree of their flocks, who work hard to continue their lineage despite the purest bred Shetland sheep remaining elusive (Bradley, 2013). In this way, finally in '2011… EU, Protection Designation of Origin status was secured for organic "Native Shetland wool".' (Anderson, 2017, p. 18). This status, though long in coming, only affects a small percentage of the wool yield on the Islands. The wool brokers Jamieson & Smith based in Lerwick otherwise collect in the majority of the wool clip across Shetland. The wool they collect is classified as coming from either Shetland sheep or a Shetland cross and is registered under the

trademark ‘Three sheep logo’ which assures that the wool comes from sheep born and bred in Shetland whether pure or crossed (http://www.shetlandwoolbrokers.co.uk).

The aesthetic aspect of the Shetland wool is its diverse colouring through a range of natural shades,

> ‘Shetland sheep are not all white….there are wools of various shades of brown, fawn, grey, “moorit”…middle toned brown…and the so called black, which is a very dark brown. Most skilful use is made of these natural colours in the native knitted goods. The colours are not very fast to light, but they have a beautiful softness, not often attained by dyed shades of the same colours. Just wherein their superiority dwells is not easy to say. Probably the comparative unevenness of the shade has something to do with the subtle charm’ (Harrison, 1956, p. 56).

Shetland sheep were originally identified by the shades their different fleeces provided. ‘Some sheep are self-coloured, others have shaded fleeces and still others have distinct fleece patterning’ (Christiansen, 2013 p. 24). Sue Russo (2013, p. 31-33) illustrated sixty-three different Shetland sheep shadings and patterns for the Shetland Sheep Society with each one given a name in the Shetland local dialect recognises this variety across the most prevalent natural wool colours white, brown, fawn, grey, black. A crofter, Mary Blanc was recorded on BBC radio Scotland describing a few examples of these fleeces using the local dialect names,

> ‘Der several colours. Da main number o sheep is white bit der flocks o moorit an some black an grey an katmoget which is a black underneath the belly an white or fawn on da top. Sholmit is edder black or moorit with a white face. Shaela is black with grey hairs among it. Bit da most you’ll fin is edder da pure moorit or da pure black.’ (Sutherland, 1984)

This description illustrates the local connection to the intricacies of the Shetland wool as a material. It highlights how each subtle change in the colouring of a fleece warrented a name such as katmogit, sholmit and shaela. It would appear that though the purest Shetland wool was hard to acquire (and still is) there remains in the wool today, even if it may be to some degree crossed, a range of natural shades in a quality that maintains a degree of lightness that is reminiscent of its purer relation. There is a sense from the literature that the older written material may well have witnessed the luxury aspects alluded to in the wool, whereas the written material since the 1970s may only have been

witness to a less pure wool. The next section looks at where the wool was being used to manufacture tweed and who was producing it.

2.2.5 Shetland manufacturers of Shetland tweed

Jenkinson's dissertation on the economic geography of the SWI is the only piece of literature that gives relative shape to the number of manufacturers producing tweed and/or knitted goods in the 1950s with one group of manufacturers having twenty-five or more employees and another group with ten or less employees (Jenkinson, 1958, p. 21). The larger group covered four main areas in Shetland: Hillswick, Voe, Aith and Lerwick. The smaller group covered Burrevoe, Ollaberry, Mossbank, Scalloway, Lerwick, Hoswick and Levenwick. In describing in more depth the set-up of these manufactures, Jenkinson did not name them but instead identified them by their geographical position. Through his descriptions, it has been ascertained that of the larger group in Voe he must have interviewed TMA. This manufacturer produced all kinds of Shetland woollen goods and traded on an international level with agents in London, USA and Europe. Regarding the smaller group, he described firstly a manufacturer based in Galashiels but with weaving facilities on Shetland at Lerwick, Collafirth and Levenwick (which the author has identified as Tulloch Ltd) and secondly a group of smaller set-ups where products were sold directly to the public through retail shops mainly in Lerwick, (Jenkinson, 1958, p. 20-23), not dissimilar to the way entrepreneurial crafters operate today in Shetland (Marr and Scott, 2012).

Shetland poet Laureen Johnson in her book 'Inside the Postcard, working life at Adie's of Voe' (2001) wrote a more vivid account of life in the SWI during the 20th century. She wrote it from the point of view of those employed by TMA between 1925 and 1991. TMA, one of the longest running, and more successful manufacturers of Shetland woollens, incorporated tweed cloths and woven goods, Fair Isle and plain knit jumpers, cardigans and accessories. However, the firm also had a local shop, a bakery, a farm and a fishery, making it a very important and consistent employer in its area of that time, contributing strongly to the vibrancy and support of the community (Johnson, 2001). Johnson confirmed how the tweed industry thrived after WW2, peaking around 1955, with the biggest importer of its tweed at that time being the USA (Johnson, 2001, p. 63-65). A series of 1960s press articles published in the Daily News Record, USA, orchestrated by TMA's American agents, used terms to promote and describe their

tweed like “The real thing” (Unknown (b), 1960), “handwoven Shetland tweeds” (Unknown (c),1963), “rich natural colours” (Unknown (d),1966).

In 1956, TMA was recorded as the only Shetland manufacturer, along with sixty-eight other tweed producers across Scotland, that made up the membership of the NASWM. This prominence implies a company that had confidence in their tweed quality and a competitive edge as a member of the Scottish tweed industry. It also suggests that the information contained in the articles that Harrison wrote for the NASWM (see section 2.2.1) on the practicalities of spinning wool, sampling and producing a tweed collection was the probable way in which TMA operated.

Two other tweed manufactures that were in operation in a similar way to TMA, producing knitwear and woven goods as well, were John Tulloch, Shetland Products Ltd (Robertson and Tulloch, 2013, p.153), opened late 1940s and closed 1975 and L.J. Smith (Duncan and Dearlove, 2013, p.152), opened early 1950s closed late 1990s. These manufacturers experienced similar success to TMA selling through agents internationally with the USA as a key market. During the 1960s in line with the fashion trends, the tweeds were often designed to go with knitted items (Robertson and Tulloch 2013, p.153).

Given Shetland tweed no longer figures on the global textile stage does it need to be considered as an example of ICH? The following section looks at its status in these terms to help consider its role within the Shetland woollens and therefore as a cultural asset to Shetland today.

2.2.6 Shetland tweed in the context of intangible cultural heritage

In 2003 UNESCO held a convention for the safeguarding of ICH. The definition of ICH, was published in the report under article 2:1 Definitions as follows

> ‘…the practices, representations, expressions, knowledge, skills - as well as the instruments, objects, artefacts and cultural spaces associated therewith - that communities, groups and, in some cases, individuals recognise as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.’ (UNESCO, 2003)

The permanence of this recognition of the existence of intangible knowledge has influenced a more established area of research within the cultural heritage paradigm, irrespective of whether one's country signed up to the convention or not. It has brought into focus the importance of safeguarding intangible knowledge globally. Safeguarding ICH has become a key topic of discussion covering the practices laid out in the convention: 'oral traditions, performing arts, social practices, knowledge and practices concerning nature and the universe and traditional craftsmanship' (UNESCO, 2003).

In Scotland a report was published by McCleery et al in collaboration with Museums Scotland (2008) entitled 'Scoping and mapping Intangible Cultural Heritage in Scotland'. The report was created in response to the UNESCO convention. It crucially posited that intangible cultural heritage was a 'living heritage'. In so doing, McCleery et al (2008) described their approach as an inventory of 'ICH in Scotland rather than Scottish ICH'. They went on to explain further:

> 'Such a definition allows for the incorporation of as diverse as possible a range of practices and knowledge that exist within Scotland, and also, simultaneously, avoids the problematic question of whether or not certain practices are specifically Scottish.'(McCleery et al, 2008)

An inventory has been stored on an accessible website (ichscotland.org) in the style of Wikipedia with the idea that new entries of 'living heritage' can be submitted for entry. This recognition of diverse practices is in contrast to the view of Scottish-ness as described by McCrone et al in their book 'Scotland the Brand' (1995). Instead there are echoes of eighteenth-century romanticism of the invented nature (Hobsbawm, 1983; Roper, 1983) mixed in with the more modern view of a multicultural heritage, as McCleery at al (2010) concluded in a paper reflecting on their report that:

> 'Scotland's inventory of Intangible Cultural Heritage will include the languages, cultural practices and knowledge of all people's 'presents on' our territory. We are one nation, many cultures.'

Such a record of all present-day practices of an ICH nature manage to range over a variety of contemporary practices in Scotland. That said, there are significant lacunae on the website, several of which (for example, in respect to the research for this thesis, only a brief three-line entry for Fair Isle knitting and no entries for Shetland lace or Shetland tweed) vitiate a multicultural stance. A similar observation has been made regarding the equivalent Wiki inventory for ICH in Finland with the suggestion that it

was ‘more of a political document than a recapitulation of skills attributed as authentic or traditional’ (Kouhia and Seitamaa-Hakkarainen, 2017). Overtly traditional Scottish craftsmanship may suffer rather than benefit from a website reliant on knowledgeable contributors to upload and add to the inventory an honest depiction of a ‘living heritage’ considered intangible, particularly those that are on the wane.

The argument is fair to point out that if it is not being practiced it cannot really be considered in an ICH context (Kirschenblatt-Gimblett, 2004). However, in UNESCO’s definition of ICH the reference to the importance of ICH being passed on across generations makes it imperative that current practices relying on knowledge from traditional craftsmanship deserve specific attention. This would better understand the scope of knowledge built up around their practice and the kind of traditional knowledge used, building on notions of identity and continuity.

2.2.7 Discussion

Ponting (1987) and Anderson (2017) both referred to the concept that Scottish tweed was an expression of its environment pointing out that the variety of tweeds in Scotland was due to the variety of places in which they had been made. Ponting (1987) discussed it in terms of the different breeds of sheep and their adaption to the different parts of Scotland’s landscape. This diversity produced the varied qualities of wool found in tweed. It explains somewhat the reason for Shetland wool being such a distinct element in Shetland tweed and aligns with the repeated references to the quality of the Shetland wool through the literature.

Anderson (2017) identified more with the relationship between name and place and how that had contributed to conjuring up the intangible sense that one might have of a particular tweed. Her suggestion that the different tweeds were inextricably linked with where they had been created may well appear obvious with regards to the colours and textural qualities of a tweed put up against the rugged and heathery landscape from which it emerged. However, it is easy to take this romantic perception of tweed for granted and therefore forget that someone had to have developed the knowledge to define his or her surroundings and translate it through to the tweed. In the context of this thesis, understanding and experiencing that creative process might bring one closer to appreciating the knowledge acquired through traditional craftsmanship as referred to by UNESCO (2003).

This suggests there is a combination of elements that contribute to traditional knowledge in quite a cyclical way. This cycle starts with the environment and its impact on quality of materials and moves to the skills required in working with those materials in response to the environment. This cycle is tacit, and the knowledge transferred experiential. In the context of Shetland tweed, it may be argued that a manufactured product does not qualify either for ICH status or as an example of traditional craftsmanship. However, as Shetland tweed originated from 'homespun', a distinct combination of handspun yarn that was in effect handwoven, there is a continuity of knowledge between these qualities to be understood more explicitly.

2.3 Traditional knowledge as an intangible element to design

2.3.1 Defining the nature of TK within an indigenous artefact

TK within an indigenous artefact incorporates a variety of subtly different perspectives, for example real (Sturt, 1923), know-how (Cross, 1990; Jansen-Verbeke, 2010), local or craft (Dormer, 1994; Seitamaa-Hakkarainen, 2017), intangible (UNESCO, 2003), typical (Lupo, 2008; Kouhia and Seitamaa-Hakkarainen, 2017) indigenous, remote, rural (George, 2010) personal (Ingold, 2013) or craeft (Langlands, 2017). These nuances of definition refer to forms of knowledge that are tacit and therefore within the more general scope of tacit knowledge which Polyani, in the introduction to his lecture series 'Tacit Dimension', described rather poetically as, 'human knowledge from which a harmonious view of thought and existence, rooted in the universe, seems to emerge' (Polyani, 1966, p.4). This quotation conveys a sense of the myriad forms of expression derived from the integration of experience within its milieu. Dormer (1994, p.14) referred to this form of experience through his description of craft knowledge as the activity of engaging all the senses by imitation, repetition, or demonstration but fundamentally not through the written or spoken word. Ingold agreed with this stance but expanded on the more subtle concept that although there is no articulation in words, craft knowledge can be expressed through a more abstract form of telling which he defined as '….to trace a path that others can follow' (Ingold, 2013, p.110). This form of telling can be found in Sturt's descriptions of his experiences when he tasked himself to learn to make waggon wheels, illustrated in this extract romancing the waggon's place in its environment,

> '-the truth is, farm-waggons had been adapted, through ages, so very closely to their own environment that, to understanding eyes, they really looked almost

like living organisms. They were exact. Just as a biologist may see, in any limpet, signs of rocky shore, the smashing breakers, so the provincial wheelwright could hardly help reading, from the waggon-lines, tales of haymaking and upland fields, of hilly roads and lonely woods and noble horses, and so on.' (Sturt, 1923, p.66)

Arnold (2010) also illustrated this form of telling in her paper, 'An assessment of the gender dynamic in Fair Isle (Shetland) Knitwear'. As well as acknowledging the activity of imitation, she went so far as to suggest that in Shetland, 'hand knitters over 60 years of age in 2003 seem to have been taught to knit by maternal osmosis' (Arnold, 2010). Her description of transferring these knitting skills through a community was clearly a phenomenon particular to the Shetlands. Smith and Bunyan (1991) identified with this by pointing out the degree to which Shetlanders had adopted and interpreted the Fair Isle pattern with subtly different characteristics across the Shetlands akin to the diversity of local dialects. Their research showed the variety of scale of the patterns from stripes of 'peerie' motifs to all-over pattern constructions. Though these forms of communication may have been tacit, the outcomes have demonstrated a very physical and visual integration of TK: both the waggon wheels and the Fair Isle jumpers were 'telling' by their mere existence.

A model called TCISM was proposed as a way of diagnosing the illusive qualities of TK in such craft-related artefacts. It has looked at biodiversity in nature as a metaphor for cultural design to propose a set of criteria that contribute to the design or redesign of a contemporary artefact drawing specifically from TK within an indigenous community (Nugraha, 2009). The model was explained in this way,

'The TCISM model illustrates the interconnection between tradition and modernity. Both tradition and modernity consist of five components: Technique (T), Concept (C), Icon (I), Structure (S) and Material (M)' (Nugraha, 2009).

Nugraha theorised that by referencing these five components in varying degrees, between tradition and modernity, it 'transform[ed] tradition' (2009) into a new product, thereby retaining cultural building blocks. The model, therefore, acts 'as a tool for analysing the content of tradition in some products and… as a tool for creating new-tradition based –products' (Nugraha, 2009). It is a guide to designers and crafters concerned with retaining a sense of tradition in their work and within their culture

ethically and respectfully and encourages the preservation of traditional ways so that they may be kept alive (Nugraha, 2009).

The model emanates UNESCO's decree to be mindful of the intangibility of TK so that it is protected and nurtured for subsequent generations. More interestingly, the categories Nugraha selected offers an insight into the varied criteria at play within a craft-related artefact. 'Technique (T)' refers to old and new activities of making, 'Concept (C) and Icon (I)' are both subjective and intangible criteria that refer to local imagery and customs. 'Structure (S) and Material (M)' are both tangible elements that command an objective reaction to old and new processes of making. Therefore, this model goes some way in shaping how one might examine the tangible and intangible qualities within a craft-related artefact.

In a more recent qualitative study Kouhia and Seitamaa-Hakkarainen (2017) referred to Nugraha's model drawing on all five of his categories and adding a sixth 'utility (function, usability, need)'. Their aim was to study how practitioners today might use these categories in their crafts. Through these categories, they found that practitioners adopted different aspects of TK for one of three purposes: to preserve TK, to mix TK with elements that were more contemporary or to re-contextualize TK into new products (2017). This study was about the makers' interactions with TK and not about TK embedded in an artefact, yet it does help explain the makers' commitment to their craft and the nature of the knowledge they might embed.

2.3.2 Understanding TK in relation to indigenous communities

Various ideas have been put forward as to what kind of creative knowledge has been integral to the progress of an indigenous community and its culture. The thread of these theoretical ideas in design thinking starts in the early 1960s.

One particular stance described communities that were self-sufficient and reliant on making everything they needed as exemplifying 'the unselfconscious process' (Alexander, 1964. p.46) and artefacts made within this process were 'a good fit' (Alexander, 1964 p.50). These descriptions were used to explain those communities that possessed artefacts with long-lasting effects as opposed to those artefacts made in more recent times that were a symptom of 'the self-conscious process' (Alexander, 1964, p.55) and were therefore inevitably short-lived and party to processes of short term problem solving. The unselfconscious process encapsulated the environment and its circumstances within which the artefact would have been conceived and constructed.

This process was slow, with change only taking place when the artefact needed to be mended or adapted, either due to its structure or in response to its context (Alexander, 1964, p.50). Alexander's perception of an artefact with implicit TK was as a functional, rational entity, purely utilitarian to show the reactive nature of a self-sufficient community.

Another theory looked at workmanship suggesting that there were two forms: workmanship of risk and workmanship of certainty (Pye, 1968 p. 24). Workmanship of risk described the autonomy the maker has over the process of making despite the unreliable nature of the outcome and its repeatability. This was in contrast to the workmanship of certainty whereby the maker's autonomy is replaced by procedures and a manufacturing structure to ensure repeatability. Pye (1968) proposed that workmanship of risk allowed the maker to remain close to the process and the risk was reliant on the maker's experience and ability to react to complications. Workmanship of certainty removed experience from the process and replaced it with a more mechanically controlled production environment.

A significant factor of Alexander's unselfconscious process and Pye's workmanship of risk is their adaptability to a problem in real time. This adaptability can be understood as evolutionary when looked at over significant periods of time,

> '…there is a tremendous respect for the form, as it has evolved so far, embodying, as it does, the otherwise unrecorded history of a thousand ways in which the artefact and its context can be attuned. Of course, the context has to be stable, within limits, for centuries, for craft evolution to be possible' (Jones, 1983, p.197).

Jones, by identifying with the nature of craft evolution, has drawn attention to the fact that these artefacts were a record of the collective knowledge that went into making them; they were in themselves a form of documentation. This type of communal knowledge has been defined as 'design ability' (Cross, 1990). These artefacts therefore existed as evidence of a shared knowledge and were an expression of the skills born out of the community (Jones, 1979, p.131).

ICH's standpoint in respect of design thinking has opened up further ways of perceiving the creative knowledge rooted in these indigenous communities. One of the remits within the ICH research field is to safeguard and preserve this kind of shared skills and knowledge as described by Cross and Jones and as illustrated as one of their findings by

Kouhia and Seitamaa-Hakkarainen. One particular reason to do this is as a go-between to inform the creative process retaining the evolutionary potential of the knowledge,

> 'ICH incorporates two characteristics that make it very relevant for creativity and innovation: its ability to synergise various fields of knowledge, as well as its capacity to distillate and disseminate a cloud of tacit and explicit information that permeate individuals and enterprises to knowledge exchange.' (Cominelli and Greffe, 2012)

The role that Cominelli and Greffe have described for ICH, as an intermediary between various bodies of know-how and understanding incorporating aspects from both the past and the present, has also been described as a type of 'meta-culture' (Kirshenblatt-Gimblett, 2004). The concept of meta-culture gives ICH a strategic advantage, reinforcing its position as vital precisely because it is a manifestation of practical and experiential activity and at the same time a disseminator of understanding to a wider audience (Kirshenblatt-Gimblett, 2004).

Drawing on the call to safeguard and preserve ICH to inform the creative process, Lupo (2006) researched in particular depth the role design could play through Kirshenblatt-Gimblett's theoretical framework of a meta-culture within the paradigm of cultural design. She published a series of papers (2006, 2007, and 2008) where she developed a conceptual model to make more explicit the way in which TK could be transacted between different parties.

Her premise was that cultural design (significantly, strategic design, design of services and design of experience for platforms like exhibitions and museums) could lessen the gap between TK from the past and public engagement with it in the present (2007). She described this process as a 'valorisation action' (2007). In effect, she suggested that the valorisation action was the 'meta' activity, the bridge between what was tacit and how it might be valued in order to be related to and understood. The concept 'valorisation-action' is specific in its role towards an artefact; to bring back into focus knowledge that might otherwise become irretrievable.

Lupo (2008) identified that there were three parties involved in this process: the gatekeeper of the knowledge in question, the designer harnessing that knowledge and persons acquiring the knowledge. All three parties were dealing with knowledge described as 'typical' (2008), referring to the specificity and particularity of the knowledge implicit in its origination and locality, explicit in how it had been expressed.

The communication of the typical knowledge between all three parties was described as a process of 'active-action' (2008), expressing this idea that by transmitting, adopting and interacting with typical knowledge it was being kept within living memory on a continuum, which is the main premise of ICH (2008). Lupo put these conceptual ideas and methods into practice with her colleagues Giunta and Trocchianesi. One such example (Lupo et al, 2011), discussed in section 2.5.2, looked at how typical knowledge within ICH artefacts was identified as cultural assets for design purposes.

Lupo's model set out a practical, transactional relationship, which indigenous communities could have with those that want to engage with their TK. McHattie et al (2017, 2018) exemplified this kind of transactional relationship through their series of workshops called 'Innovation from Tradition', which set out to 'develop cultural assets and build creative capacity and capability' (McHattie et al, 2018). By using participatory design, they worked with local textile practitioners in Shetland and Orkney to instigate a dialogue of understanding and appreciation of their context as a springboard for cultural and creative progress through the three main drivers identified by the practitioners as practice, place and people. This approach opens up the possibilities of TK in an evolutionary and optimistic sense through collaborative means to contribute to and tap into a creative economy despite its fixed circumstance, which in this case is because Orkney and Shetland are island communities.

Dillon and Kokko (2017) on the other hand presented a more conditioned side to TK exchange. Through their comparative study with six textile craft practitioners, two each from Estonia, Cyprus, and Peru, they looked at the transactional relationship crafters have to go through to nurture and maintain TK. Using situational analysis, the common threads of identity, custom and place were found between these crafters, giving them their raison-d'etre to live in their community and practice their craft. This context was described as a cultural ecology to express the 'processes of continuity and change, the restless dynamic that shape cultural patterns and cultural traditions' (Dillon and Kokko, 2017). This study underlines the precarious nature of craft communities and their struggles to adapt and survive due to globalisation, highlighting the driving forces each country apparently can have towards traditional creativity.

2.3.3 Discussion

Lupo, Nugraha, Dillon and Kokko, and Kouhia and Seitamaa-Hakkarainen, McHattie et al were unified in particular by their conceptualisations of what cultural design might

be. By breaking down creativity and craft into component parts, grasping a sense of the relational values at play, they highlighted the wider context encapsulating these practices. This wider context was described as the 'locality' of TK, (Lupo, 2008; Nugraha, 2009), a community vernacular (Kouhia and Seitamaa-Hakkarainen, 2017) and cultural ecology (Dillon and Kokko, 2017) and a creative economy (McHattie el al, 2017, 2018). All four terms are suggestive of the complexities and interrelatedness of the tangible and intangible elements involved.

Reflecting on Nugraha's TCISM model, 'Technique (T) 'Structure (S) and Material (M)' exist together because of the way in which the indigenous communities have responded to their environment. These tangible elements together provide a form of prescriptive knowledge (Dillon and Kokko, 2017). These three criteria would have had differing roles within the process of making with respect to their context so that TK could be examined by how these three criteria are adopted and their effect on the aesthetics of the culture. However, Dillon and Kokko (2017), resonating Alexander's unselfconscious theory, make the point that although technique, structure and material are relevant and learnable within a craft context, there is another factor. They have to coexist with, 'judgement, dexterity, experience and other forms of tacit knowledge [which] mean[s] that there is always scope to improve or adapt a craft artefact 'from within' or in response to some external pressures' (Dillon and Koko, 2017). This form of knowledge is experiential and requires a philosophical position to justify it through research and make it more explicit (Niedderer and Townsend, 2014).

2.4 A phenomenological approach in design research

2.4.1 Defining design phenomenology

Phenomenological theory draws on the essential components of place or context and the generational communication of knowledge about or consciousness of objects, whether observed or created – and how these components interact. A precise and highly practical example of this theory in a social context is the emergence and development of craft tradition.

Phenomenological research is '…a reasoned inquiry which discovers the inherent essences of appearances… [and that] …an appearance is anything of which one is conscious.' (Stewart and Mickunas, 1974, p.3) This form of consciousness is known as

the ‘intentionality [of consciousness and] signif [ies] how we are meaningfully connected to the world’ (Vagle 2014, p.27).

The origins of phenomenological thought can be found in the work of Husserl and his student Heidegger, but their core beliefs and approaches differed in how phenomenon existed in the world. Husserl believed in the importance of essence, which he called ‘eidos’ (Greek for idea), in the sense of what a thing is, as it shows itself to consciousness, as it might be experienced. Heidegger’s beliefs tended to be closely aligned with hermeneutics and had a more ontological concern with the concept of being in the world. He called this ‘Dasein’ (meaning being-there); an expression of consciousness in the world, as constant and changing experiences within time itself (Stewart and Mickunas, 1974).

Vagle (2014, p.30) made the point that in adopting Husserl’s eidetic approach, ‘intentionality is assumed to have essential structures or qualities’ whereas in considering Heidegger’s approach intentionality is being constantly interpreted through ‘manifestations and appearances’.

Ultimately, this synopsis of the early, core phenomenological beliefs has outlined a theoretical approach that considers how experience and interpretation are integrated in response to something (or someone) within a circumstantial framework. Just such a situational construct was recognised in a myriad of scenarios and studied initially by academics at the Utrecht School where their interest lay in the description of practice to find patterns in such intangible characteristics as emotions and behaviour (van Manen, 2007). This practical and descriptive approach was subsequently advocated as a methodology of reflection to study practitioners’ activities in work and was called ‘phenomenology of practice – reflection on the reflection-in-action of practice’ (Schön, 1987 p. 322). Schön (1992) then took this perspective into design research calling it ‘design phenomenology’ and described these circumstantial frameworks as ‘design situations’.

Cross (1999) considered a slightly different perspective when engaging with the potential of design phenomenology. He considered how design knowledge might be studied by setting out his view of three significant fields of research:

- ‘design epistemology - study of designerly ways of knowing,
- design praxeology - study of the practices and processes of design, and

- design phenomenology - study of the form and configuration of artefacts'.

In stating in the third field that artefacts held design knowledge in a phenomenological way, he then clarified that traditional craft objects best exemplified the kind of artefacts to be studied in this way because they held 'knowledge implicitly' (1999). It would appear therefore that Cross was suggesting indirectly that by unlocking the critical composition within an artefact it would be a step closer to experiencing the intentionality of its construction from within its environment. This sense of a phenomenological approach appears aligned with Husserl's belief that intentionality could be deconstructed. To evolve an artefact is to know its sum parts, tangible or intangible, intimating the degree to which an artefact can be understood as an integration of collected ideas and experiences.

Taking a third design phenomenological perspective, Vial proposed that design knowledge was incomplete if one was not more aware of how designed objects were experienced as 'phenomena-in-the-world', calling this approach 'The Effect of Design', (2015). Rather than looking at the conception of design in an object he was interested in how the design of that object might impact on its context.

Schön, Cross and Vial have each proposed, relatively objectively, different perspectives on how a phenomenological position can help to consider a design context. Schön's position was to scrutinize the designer's activity and thinking in real time. Cross's approach related to artefacts as time capsules of knowledge to be examined. Vial was interested on the impact an artefact can have once it is made.

Rather more subjectively, Langlands (2017) in his book 'Craeft' posits that this thousand year old Anglo-Saxon word has a place in today's fast paced, digital age. He defined the word craeft 'not just as a knowledge of making but as a knowledge of being' (2017, p.21). The author suggests that this definition is indirectly phenomenological in its effort to reconnect with experiential knowledge gained through active participation, however onerous the craeft work might be. Langlands use of the word is an attempt to remind us of a slower way of life, underpinning the legacy that know-how knowledge has had, still has, and can continue to have today.

These four phenomenological standpoints help to reflect on ways in which a craft related artefact may be studied for the experience that goes into making it (one's own or

another), its implicit knowledge and its experiential effect. A fifth contributory factor towards an artefacts conception to assess its evolutionary qualities is the environment.

2.4.2 Perceptions of environment

A phenomenological position has been taken in humanist geography that considers the experience of place (Relph, 1976; Tuan, 1975(a)), the definition of which is '…the largely unselfconscious intentionality that defines places as profound centres of human existence' (Relph, 1976, p. 43). Perceptions of space also come into this theorisation as way of contrast. However, the author feels that as the ideas attributed to space require an empirical standpoint (Tuan, 1990), they do not relate to the subjectivity and reflexivity of this thesis.

Essentially, in reference to phenomenological thinking, Relph and Tuan brought the intangibility of experience and perception to the forefront as a way of constructing and understanding place. One medium through which this was conveyed was the senses (Tuan, 1990) and how immersion in a place can build perception from within as with '... such elements as distinctive odours, textural and visual qualities in the environment, seasonal changes of temperature and colour…' (Tuan, 1975, (b) p.152). Another medium was in describing the intentionality of place like a stage set, laying witness to acts in a play or, by default, playing a part (Relph, 1976, p. 42).

This quadrangular relationship between place, human existence, objects and/or events occurring within has connotations to a fixed abode or particular zone. Ingold (2000, p.190-193), from an anthropological viewpoint, recognised this restriction and proposed instead the use of the word landscape to incorporate the recurring sense of change that an environment manifests. Landscape expresses the sense that the environment has been made up of configurations of natural and human interactions over extensive periods. These configurations can be read as 'forms in the landscape' (Ingold, 2000, p.193).

The idea that appeared to be developing from this phenomenological stance on environment was a constant refraction of abstract experiences that manifested themselves in concrete constructs. This has highlighted the intrinsic correlation that can be found between the environment and all that can be experienced within it. One way in which this correlation has been understood more forensically has been through the method of deep mapping,

> ‘A combination of creative writing, and artistic representation, [it] transcends the representational rendering of travelling through landscapes and places by a psycho-geographic approach to communicate a human engagement with a complex melange of their ecology… The essence of the approach is to capture the ‘’sense of place’’, and even the ‘’spirit of place’’, of the worlds around us’ (Osborne, 2010, p. 237).

A deep map can hold a mix of qualitative and quantitative data as well as operating like an ‘archival workspace’ (Ridge et al, 2013). Deep mapping allows the researcher to drill through a landscape to mine its implicit and experiential knowledge. The scope can be wide and in-depth, the outcome a body of interrelated data, visual and textural; an artefact in its entirety. It could be argued that creative practitioners today, crafters and artists, conduct a form of deep mapping through their work in response to their environment and culture. Their experiences and impressions translate into artwork and crafted pieces. An example of this can be found in a paper by McGaw (2014) where she described how Australian artists and crafters of aboriginal decent while investigating and recreating the ancient craft of making a possum-skin cloak found themselves retracing their past, uncovering eighty-one forgotten stories in the process. Originally, these possum cloaks, single skins to fit children first, grew through the patch working of adding skins as the children became adults. The skins were embellished on the inside to record the owner’s environment and their aboriginal group. ‘Making and knowing were inextricably linked: those who made the marks were bearers of the knowledge they signified’ (McGaw, 2014). This example shows a direct and retrospective link between the crafter and their past combining different layers of origination, identity and custom achieved through the process of making and documentation.

A more contemplative approach is exemplified in the work by creative practitioner Cecilia Heffer who has mapped her personal experience of landscape and evoked it through her study of and creation of lace. She has described her work in the following way,

> ‘I view my work as a practice of a practice made up of iterations of the one intent – that is to explore notions of making as an embodied response to the materials and places that I work and live in’ (Heffer, 2018).

She has used her lace work to express her experiences of awareness and understanding for landscape in whatever way she might perceive it, depending on the context. Her

process allows her to develop a dialogue with the context through visual and written documentation and reflection that enables her to build up her sense and perception of where she is. Along these journeys, she may pick up parallel narratives that weave into her work (Heffer, 2018).

Both the possum cloaks and the lace pieces are in effect a form of telling, referred to by Ingold, earlier in this chapter. The possum cloaks are illustrative of Ingold's perception of making which describes full emersion in the activity of following to assimilate. Whereas Heffer is telling through her work as an intermediary as she takes one through a more personal and subjective trajectory. Essentially, though these textiles have become the experiential medium for communication of the landscape.

2.4.3 Discussion

In review of design phenomenology and a phenomenological perspective on environment a significant question is how to capture the tacit nature of such a context. Relph considered how the identity of place might be broken down into 'interrelated' (1976, p. 48) component parts, each component part organised by its tangible or intangible nature in relation to its circumstantial and experiential values (1976). Niedderer and Townsend proposed for craft research that descriptive ways of capturing experience were appropriate in making it explicit and relevant, explaining that 'where a comparison is made on an experiential basis, it may not be 'objective' in the sense of being quantifiable, but it may be confirmable' (2014, p. 636). Langlands used the words 'describe' and 'map' suggesting ways to carefully observe how crafters think with their hands, with a caveat that unless one engages with craft oneself one will never really know the essence of what it means to craeft (2017, p.32).

Schon, in working through his perception of design phenomenology in collaboration with his colleague Porter, used a form of description. They identified design situations to study where they followed the interactivity of the designer at work, an approach similar to the Utrecht School. Their method was to break down the designer's actions and responses to the design situation into different categories which were called rules, types and worlds (Schon, 1988; Porter, 1988). Then within these categories, they described what they observed.

Descriptive methods in deep mapping have also been used to document the experiential layout from within a locality (Postiglione and Lupo, 2006; Aitken, 2015) or from the perspective of a traveller passing through (Brenna, 2009; Ethington and Toyosawa,

2015). The advanced technology of geographic information systems (GIS) has enabled this descriptive approach to be embraced in a much more in-depth and diagnostic way, looking at for example the interplay between memory, experiential activity, and the outcomes from those effected by time (Bodenhamer, 2015). Bodenhamer did warn that this quantitative approach, though thorough in its ability to bring together material from different periods and disciplines, must not lose sight of the 'intangible and socially constructed world' (2015, p.10) that can be obtained by a more qualitative discourse.

It is apparent that ways of describing make more explicit what is otherwise elusive. Langlands and Bodenheimer's warnings are appropriate reminders of the relevance of the context in relation to a study and that any distance created may weaken the richness of understanding and so the quality of the description.

2.5 Four design research projects working with traditional knowledge

This section looks at four design related research projects that have been conducted for the purpose of diagnosing craft-related artefacts to evolve their design, inform redesign, or inspire new design. The author has assessed how successful these projects appear to be in light of the literature that has been reviewed in this chapter and what can be taken from them in relation to the author's own research.

2.5.1 Interpretation of traditional knowledge for the creative process

This section reviews two design briefs, one studying Danish peasant textiles, the other Hellenic textiles, have informed design contexts. The common denominator between them is the identification of cultural characteristics in promotion of a cultural identity. The differing factors lie in how the cultural characteristics were adopted. In reference to Kouhia and Seitamaa-Hakkarainen's conclusions (2017) in the case of the Danish peasant textiles, the TK was preserved and mixed with elements that were more contemporary, whereas in the case of the Hellenic textiles the TK was re-contextualised.

Cock-Clausen (1996) documented an account of an early 20th century period of textile design history in Denmark in a paper entitled, 'The weave workshop, "Vaevestuen", the national tradition as a basis for modern weave'. Between 1915 and 1940 a group of designers and practitioners purposefully referenced traditional peasant textiles to inspire contemporary designs for the Danish interiors market of the time. This group together founded the Weave Workshop in 1913, and Cock-Clausen attributed its success to the relationship it had with the Danish museums and archive collections in general and its

theoretical stance on design at the time. Two key figures involved in establishing the workshop, architects Anton Rosen and Martin Nyrop, were described as being, '…preoccupied with the question of how experience and knowledge in crafts could be combined with new ideas about form and concepts of beauty.'(Cock-Clausen, 1996)

Cock-Clausen proceeded to explain that the method by which the Weave Workshop started to answer this question was by simply collecting, analysing, and weaving old patterns. The process built up a significant collection of knowledge and replica samples which eventually inspired more contemporary weave designs. These contemporary designs started off by reconsidering use of colour across traditional patterns, then by reconsidering traditional pattern layouts and finally by introducing different yarns in the loom. This incremental approach to developing ideas acknowledged the importance of experience as a way of understanding the detailed construction of the traditional textiles (1996).

Cock-Clausen stated that this approach enabled the process to highlight 'elements… of an aesthetic and a national character', that were subsequently communicated in textiles of the day (1996). It is interesting to consider the use of the word 'elements' to convey traditional patterns constructed by component parts, in combination, expressive of a cultural identity. Cock-Clausen credited the involvement of the Danish museums and archive collections as their agenda was to promote the awareness of traditional Danish textiles as a cultural heritage (1996). These museum collections were '…actively used …to learn from past craftsmen's technical skill and their understanding of materials and of the character that distinguished so much of the old work…' (Cock-Clausen,1996).

Her portrayal of the weave workshop highlighted a patriotic desire to savour tradition because the textiles provided a sense of identity. This sense, though intangible was recognised as being part of Denmark's heritage. As she concluded, one particular series of exhibitions in Denmark, organised by The National Museum of Decorative Art and the National Museum between 1940-41, '…were intended to promote an understanding of the cultural value of peasant textiles and safeguard them for posterity' (1996). Such an intention was progressive in its purpose, especially in light of the fact that it took a further sixty years before the safeguarding of intangible cultural heritage was ratified at the UNESCO convention (2003).

The second example portrays a student design project within a textile design school in Greece. It assessed their response to historical material and how they used it in their

design process. A small research team provided the design brief which was to reference Hellenic textile history to inspire design innovation to produce new products,

> 'Textile design will operate as a leading discipline of innovation only if it incorporates the valuable knowledge of history and heritage in a fluent process towards the success of a design enterprise.' (Perivoliotis, 2005)

Perivoliotis, who led the research team, introduced the idea that history and heritage together can inspire innovation in design. History and heritage do not tend to operate in the same space due to their opposing perspectives and objectives (Raphael, 1994). Therefore, the question the author considers is where exactly the valuable knowledge lies: in history or heritage or whether actually in practice.

Perivoliotis (2005) described how the students could use any material they wanted from the extensive historical research conducted into ancient Aegean, Minoan, Mycenaean and classical styles. This implied the students' context was seemingly wide and the students approach unfettered. She also explained that as the students were studying textile design, they were encouraged to consider how they might replicate the making of the Hellenic textiles because 'there [were] fragments of tapestries that prove[d]…. the versatility of textile production' (Perivoliotis, 2005).

In this way a general sense of a period of history was studied by the practical means of making textiles. The research team concluded that the outcomes were to inspire 'young textile designers with a spirit for innovation based on respect for their history of design' (Perivoliotis, 2005). There is a relevance to appreciating more extensively an historical context, but the question is whether the scope of the contextual study was maybe too extensive and whether it had been made clear through that scope what kind of historical sense was captured in the designs that the students eventually produced. The students' responses were wide, covering a collection of products: from clothing items to printed textile lengths and even a design for a toothbrush.

Perivoliotis appears to have put more weight on the benefit of the historical research. That said, the most significant outcomes from the project appear to have been the activities of practice that the students engaged in. This experience alone would have added cultural understanding to the products that were made. The author suggests therefore the valuable knowledge is to be found in the experience the students had in replicating the ancient Greek textiles rather than in the unfettered approach the students were given towards what they chose to use from the historical context.

2.5.2 Cultural design research projects to safeguard transferable knowledge

This section examines two cultural design studies that adopted a theoretical model developed around the concept of the 'active-action' of typical knowledge by Lupo (2008) within the context of a living heritage (Kirshenblatt Gimbett, 2004). The first study, conducted by Lupo and two of her colleagues, followed a student design project referencing artefacts used in Beijing Opera. The second study was conducted by three cultural design researchers in Shanghai working with a craft community on the Island of Chongming. Both had stipulated that typical knowledge was part of an open-ended knowledge system as defined by Sennet (2008). Sennet's definition covered crafts that had evolved over long periods because they had been able to adapt and change, crucially within their context, evoking very much the position Alexander (1964) took in naming this process as 'unselfconscious'. The differences between these two studies was how they used the model to steer the research. They both started from the same references, however their contexts were very different and so were their outcomes.

Lupo and her colleagues wrote up their research in a paper entitled, 'Design Research and Cultural Heritage: Activating the value of Cultural Assets as Open-ended Knowledge Systems' (Lupo, Giunta and Trocchianesi, 2011). By drawing on the concept of open-ended knowledge systems in the title it posited that cultural assets might be identified and proliferated through this kind of system to inform the design process.

Lupo et al implemented their method of research on a design student project in Milan, briefed to study a collection of costumes and props from the Beijing Opera (lent to them by the Foundation Ada Ceschin Pilone, Zurich). This provided a context for the students to prepare their own hypothetical design briefs. The researchers' first objective for the students was to identify the main characteristics of the artefacts. A form of description was used to 'extract' (Lupo et al, 2011) the apparent visual information into thematic phrases '…value-elements …minimum cultural units …cultural archetypes …conceptual elements of characterisation' (Lupo et al, 2011). These phrases were then measured by whether they were referring to tangible or intangible knowledge and tangible or intangible characteristics. This enabled monitoring of the kind of knowledge the students adopted to develop their hypothetical design briefs. Fifteen potential design directions were documented in the form of a 'visual abacus' (Lupo et al, 2011), and then each of these design directions had their own mood board and written proposal.

Fourteen of these briefs harnessed elements from the costumes and props to be re-contextualised, a finding as described by Kouhia and Seitamaa-Hakkarainen (2017). Only one hypothetical brief aimed to appropriate the traditional characteristics for the Beijing opera as a re-design. This particular brief was less successful because it was 'due to insufficient knowledge about the eastern context' (Lupo et al, 2011). This is an interesting observation because it has highlighted that despite the descriptive process the students were too removed from the study topic to extract knowledge that was in-depth enough to confidently contribute to the evolutionary aspect of these cultural artefacts. The students did not experience making any of these costumes or props. They appear instead to have only studied and categorised their visual response to the artefacts to identify trends in characteristics.

More significantly the students' activities (which resulted in mood boards and theoretical design briefs) might be characterised as an example of metadesign within the design process because the brief outcomes together created, 'a context rather than content' (Lupo et al, 2011). Giaccardi (2005) has written extensively about meta-design's role as an important component to the design process, explaining that during this design phase 'design of the design process' occurs. She explained that the activities of metadesign can be found in 'critical and reflexive thinking about the boundaries and scope of design'. This process is characteristic of a form of research but fundamentally it is interactive and more often than not communal, especially in today's culture of on-line social platforms where sharing information is crucial to the development of ideas.

The second study conducted on the Island of Chonming in a craft community was written up in a paper, 'Bamboo entwines: a design intervention to envision culture and innovation values of local crafts'. The aim was to:

> '…verify the hypothesis that the "use value" of local culture relies on the capacity of design to enhance and make accessible this heritage as a system and as a process for new users and users' (Valsecchi, Pollastri and Yongqi, 2012).

Valsecchi et al (2012) worked directly with the community in Chongming to understand their craft knowledge to help them take advantage of their know-how ability to develop sustainable products that would benefit their inhabitants. The craft studied and supported in this way was basketry and its material was bamboo. In order to conduct this research, they facilitated a process of 'co-design' between the local crafters and the researchers to develop new products. They described the value of the new products as

an expression of the co-design process where they and the crafters shared knowledge and developed ideas. Through the production of the products, they put the emphasis on the experience of the co-design process rather than on the actual outcomes. This has suggested that it was the communication within the co-design situation that had been recorded through the evolution of the outcome making the outcomes representative of this process.

2.5.3 Discussion

The 'weave workshop' is a good example of a forerunner of safeguarding ICH for the creative process. Significantly, the incremental approach, over a twenty-five year period, to learning the TK and then adopting the knowledge to inform contemporary designs is illustrative of the evolutionary way in which such artefacts can be made. It also exemplifies a form of telling, the adaptability of the practitioners and their collective knowledge. Its success was in the time invested in the research of the textiles and then the development of them.

In contrast, a student project that set out to capture Hellenic characteristics for design outcomes probably benefited more from the experience of making. Time would not have been a luxury and therefore the accumulation of knowledge would have been compromised by this limitation in order to achieve an outcome. This is not to say that such a design brief is not relevant to a student's learning; instead, it highlights the degree to which students' learning is different from that of crafters. Maybe students' awareness of a such a model as the TCISM might help to rationalise the kind of knowledge needed when working on such a project.

A comparison can be made between Lupo et al and Velsecchi et al approaches in using the active-action/typical knowledge model in their practical situations. Lupo et al fundamentally called their outcomes a form of meta-design whereas Valsecchi et al described their outcomes as a form of co-design.

Valsecchi et al did specific fieldwork and their activity was within the craft context and for the craft context, keeping active a form of cultural identity. Lupo et al, on the other hand, studied artefacts outside their cultural context as a way of informing new design directions. Where Valsecchi et al used co-design to facilitate a hands-on experience with the crafters and their craft, Lupo et al worked with a process of description and categorising, relying much more on visual interpretation to develop understanding as a precursor to the design process. In question is Lupo et al's claim that the outcomes of

the research were an example of the open-ended knowledge system. They contested themselves, 'Even if it is the results of a subjective selective and interpretive process it is potentially open to infinite further declination, application and uses' (2011). The suggestion here is that the open-ended knowledge system is the meta-design phase, despite questions about its quality and subjectivity. Surely a knowledge system is built up because of its intangible qualities that are part of a collective appreciation and awareness. Valsecchi et al on the other hand drew their knowledge from an immersive and experiential position. They were hardwired to a knowledge system that had evolutionary roots in TK. This would seem to be a more real example of a design process, which had adopted Sennet's premise.

2.6 Summary and research gap

The definition of the 'design of the cloth' in the context of this research sets up a framework to appreciate Shetland tweed's distinctive characteristics through the literature. It identifies the three key elements to evaluate; the woollen quality, use of colour and their combination in a 2x2 twill weave structure. Within these elements are two more particular details: the degree to which the quality of the wool is dictated by where a particular breed of sheep has grazed, and the different ways in which colours are developed through spinning and how these colours often reflect the surrounding landscape.

Review of these general and established modes of design-related practice for Scottish tweed, emphasises that the literature covering Shetland tweed is concentrated primarily on the conflicting views regarding the quality of its wool between the 1930s and 1970s. However, the author feels the literature covering TMA outweighs this due to the apparent success the manufacturer had selling to an international market. This offers a relevant avenue of research to study examples of their tweed more closely for evidence of a design aesthetic.

The mid-20th century appeared to be of interest for Shetland tweed not only because the tweed industry experienced significant change with USA market but also because export sales peaked. Its diminished position amongst the Shetland woollens by the 1970s brings to question whether Shetland tweed ought to be considered not only as an example of TK but also through the paradigm of ICH because Shetland tweed had actually evolved from the Shetland version of a homespun cloth. Therefore, the review has looked at research grounded in an understanding of design practice and design

thinking which has distinguished different ways in which TK presented itself through a craft related artefact. The research perspective is underpinned by the consensus that TK predated design knowledge. The most pertinent metaphor to this research has been Ingold's concept of 'telling' introducing the sense that artefacts are part of an evolutionary journey and can be read by their construction through the knowledge they had collected along the way.

The philosophical position of phenomenology provides a perspective from which to contemplate the evolutionary and relational elements that come together to create an artefact and thereby the effect that artefact has on its circumstances. Cross's perception of design phenomenology was aligned with Ingold's form of telling and it described artefacts as having inherent layers of tacit knowledge that could be deconstructed. This position corresponds to Relph's phenomenological concept of concomitant elements that inhabit an environment. Cross, Ingold and Relph's theorisations together provide a platform from which to consider through practice the relationship Shetland tweed has with Shetland's landscape and the Shetland family of woollens, resonating with Scottish tweed's inextricable association to Scotland's landscapes.

The TCSIM model, the valorisation /active-action system, deep mapping and the research that is in line with or in relation to these models provide various angles from which to conceive of reading into a craft related artefact or its environment. A common denominator running through these approaches is a descriptive method to capture perceptual, intangible and experiential elements. This method appears particularly useful where the author's practice-based position to relate to the contextual research environment is not just through her own experience but also in relation to what has been. A form of description appears the most unifying method for such a task. This is most thoroughly exemplified in the meta-design project devised to diagnose theatrical props from opera, which acquired knowledge by a descriptive method of categorising and coding. Although the outcomes of this project were contentious in their conclusions it is the process of coding in this instance that inspired how the material in this research might be dismantled and assimilated whether studying original artefacts or making practice-base pieces.

The four specific research approaches working with TK, laid out in section 2.5 have been discussed because they all had the same objective: to make more explicit and to harness knowledge that was implicit within traditional artefacts. However, each relate differently to their objectives, illustrating the various ways in which to determine such a

design context. The most thorough and impactful of these examples proved to be the Weave Workshop's focused replication of woven samples to assimilate TK only to be used later to redesign or modify textile designs for a contemporary market. This example in particular shows how new knowledge can be accumulated through experiencing TK.

Reviewing the literature, the author has identified a gap in research that might develop a deeper understanding of the design ability that went into constructing Shetland tweed to achieve its aesthetic. A phenomenological position would steer the research towards descriptive methods of categorising and coding as well as forms of replicating TK through practical processes.

Chapter 3 - Methodology, research structure and methods

3.1 Introduction

The bedrock of this thesis, however it developed, was necessarily going to be the effect of TK on design. The TK here resided in the combination of the material studied in Shetland museum textile displays, textile archive collections and the Shetland landscape. The subjectivity of the research situation as research through practice and the heuristic relationship the researcher had with that situation has been described as a form of 'experienced phenomena' (Schon, 1988). Therefore, the author has focused on making this 'experienced phenomena' more explicit.

The author's starting point to collect visual material has been recognised as **'…** an ongoing process, which keeps designers sensitive to their social, cultural and technological environment in relation to their design problems' (Keller et al, 2006). The way in which this material was initially related to, especially with regards to the textile archives and museum displays, was with a view to identify the textural qualities rather than the historical relevance (Magee & Waters, 2011). However, it was clear that for the fieldwork conducted in the Shetlands and the associated reflective work continued on return from those visits properly to interrelate, a methodological position, a unified structure and compatible methods were essential.

3.2 Methodology

In order to work consistently across the perspectives of museum, archive and landscape from a phenomenological position, a constructivist grounded theory approach was adopted to generate and gather the data. In order to work with the data through practice to develop theory, a constructivist approach was taken as it is understood within the field of art theory. Both these approaches have been supported by the use of reflection to identify with the different threads of thinking through the research.

In effect, the methodology for this research was first in experiencing the context by breaking it down into descriptive blocks (constructivist grounded theory) and then in re-experiencing the context by using the descriptive blocks to rebuild it (constructivism). The outcomes are representative of the knowledge acquired through this process.

3.2.1 Constructivist grounded theory

Glaser and Strauss (1967, p.1) originally established grounded theory as a significant research framework for the social sciences to support their premise that theory could be 'discovered' during the process of generating and analysing data. This position has been challenged with a constructivist argument that theory is constructed from the data and therefore, crucially, not discovered, 'we are part of the world we study and the data we collect.' (Charmaz, 2006, p.10). In keeping with the phenomenological perspective, a constructivist view on grounded theory is concerned with how experienced phenomena connect and interrelate (Gibson and Hartman, 2014).

This idea that theory could be constructed from the data corresponded to how the design process has been described. A design direction is constructed out of the designer's direct involvement with and use of accumulated knowledge acquired from repeated problem solving investigations and scenarios in context (Schon, 1988). Therefore, outcomes to the design problems are constructed from information that collect through the process as perceived by the designer in relation to the context. The parallel being made here underpinned the way the author related to the research material to generate data to inform the practical studies.

The data was generated through the process of coding; attributing description to textural, visual, or written information so that it could be read in clear blocks (Charmaz, 2006; Saldana, 2009; Miles et al, 2014). The role of coding is 'as the pivotal link between collecting data and developing an emerging theory to explain these data.' (Charmaz, 2006, p. 46). The use of coding in this research is discussed in more detail in section 3.4.4.

3.2.2 Constructivism

The author's experience of developing design ideas through knitwear has evolved since her M.A degree, from her intuitive understanding of the 3-dimentiality of the medium and the mathematical building blocks required through choice of yarn, to construct and connect shapes to achieve form. Such an approach to practice was echoed in a text describing the work of textile artist Ann Sutton as being grounded in constructivist thinking where she 'explor[ed] the logic of the system within the characteristics and properties of the material' (Tebby, 2003, p. 95). (Ann Sutton originally founded the Ann Sutton Foundation which later moved to Shetland as ASF Shetland where some of the practical aspects of this research were undertaken). She trained as an art student in

constructivism under the tutelage of Kenneth Martin, a sculptor primarily concerned with kinetics, who wrote extensively on constructivist theory:

> ‘Construction stems from within. The work is the product of inner necessity and is created through an inner logic, i.e., a developing logic within the work that results in form’ (Martin, 1964, p. 284).

The unifying concerns of constructivism have always been with ‘attention to…surfaces, textures and limits; to line and to interval; to measure, process and scale; to calculation; to pattern and efficiency…evolving relationships of matter, manufacture and form.’ (Taylor, 2014, p.14). By labelling this process of working familiar to the author as a form of constructivism, the author was able to identify with parameters found in the research context that would frame the practice.

3.2.3 Reflection in practice

Fieldwork is recognised as an important part of the research process. In a sociological paradigm, it has been described as ‘first-hand immersion in a sphere of life and action’ (Glaser and Strauss, 1967, p. 226). In an anthropological context, it is seen as a form of ‘learning from elsewhere’ (Rose, 2010, p. 222). In this research through practice scenario, the activity of fieldwork was consistently relevant requiring the researcher to interpretation through knowledge. Such confidence was strongly influenced by the work of Schön, particularly in his ‘The Reflective Practitioner’ (1983), where he identifies reflective work in two ways: reflection-in-action and reflection on reflection-in-action. His concept of reflection-in-action connected the tacit links between intuition and action.

> ‘Usually reflection on knowing-in-action goes together with reflection on the stuff at hand. There is some puzzling, or troubling, or interesting phenomenon with which the individual is trying to deal. As he tries to make sense of it, he also reflects on the understandings which have been implicit in his actions, understandings which he surfaces, criticizes, restructures, and embodies in further action’ (Schön, 1983, p. 50).

This perspective has been described as ‘improvisational’ and reliant on ‘feeling, response and adjustment’ (Gray & Malin, 2004, p. 22) and indeed in this research context reflection-in-action occurred in direct response to the fieldwork, even creating

‘action-led’ cycles of collection, examination and re-focusing of the material (Miles et al, 2014).

Reflection on ‘reflection-in-action’, on the other hand, was in direct response to both the field and reflective work together as a complete cycle of action-led research. This form of reflection occurred as the practice reflected on each of these cyclical actions.

> ‘When a practitioner does not reflect on his own inquiry, he keeps his intuitive understanding tacit *and* is inattentive to the limits of his scope of reflective attention’, (Schön, 1983, p. 282).

3.3 Research structure

The research structure was organised into four inquiries: three exploratory inquiries and one practical inquiry. Each of these inquiries was further divided into two sub inquiries which the author called clusters. The word cluster was adopted to identify with the sequential grouping of methods used in response to the field and reflective work as the research progressed. As a result, the research went through four action-led cycles, each one of which concluded in reflection on reflection-in-action. The clusters generated bodies of work recognised as outcomes due to their generation in an exploratory inquiry, makes due to their generation in the practical inquiry, or matrix due to the correlations being made across the inquiries.

The following sections clarify in more detail the inquiries, the clusters and the four action-led cycles. The author has attributed alphabetical labelling to the inquiries and matrix and numerical labelling to the clusters, outcomes and makes in order to track the patterns of work that developed. These labels have been referred to alongside a more descriptive explanation.

3.3.1 Inquiries

The four inquiries have been labelled:

- 'A Landscape' to describe Shetland as an open landscape and the details within
- 'B1/B2 Collections' to describe (B1) collections gathered from the open landscape and (B2) collections studied in the museums
- 'C Archives TMA' to describe the TMA archive material studied in the Shetland Museum and Archives and Shetland Museum Store
- 'D Making' to describe the activity of practice conducted through visual analysis and editing collated through matrix tables, knitting and weaving.

The first three inquiries ('A Landscape', 'B1/B2 Collections' and 'C Archives TMA') set out to explore the research field. Methods were selected to gather, organise and filter the material into data. The fourth inquiry ('D Making') set out to trial the data through practice and methods were selected to construct practical responses.

'A Landscapes': The author's accommodation, organised by ASF Shetland, was Cunnister on Yell, the island north of Shetland mainland. She travelled from Yell across Shetland visiting, often repeatedly, parts of Shetland: Lerwick, (main town and port for the Shetlands), Walls (south western mainland), Eshaness (northwest mainland coastal, volcanic rock), Muckle Roe (west mainland coastline on a limb) and over to Unst (furthest island north in the British Isles).

'B1/B2 Collections': *B1 Collections*: gathered from the landscape were of naturally occurring material in the landscape collected by the author: beach stones, seashells and Shetland sheep wool. *B2 Collections*: from the museums on display and studied at the following: Shetland Museum and Archives (SMA), Unst Heritage Centre and Boat Haven (UHC & BH) Textile Museum (TM).

The SMA based in the centre of Lerwick on mainland Shetland is an extensive collection depicting life as it has evolved on Shetland from the Vikings and earlier to present day. It has a unique textile exhibition covering all aspects of textiles from weaving, knitting to rug making.

The UHC & BH based in Haroldswick, Unst, is the most northerly heritage centre in the British Isles. The UHC has on display a variety of objects across all aspects of their history of a crofting life with special attention to the story of the Unst lace knitting, a

significant part of their crofting legacy. The BH is a particular collection of Shetland fishing boats and all other items relating to the Shetland activity of fishing and its environment.

The TM is a community-run museum located on the outskirts of Lerwick in the Bod of Gremista. It is exclusively dedicated to all aspects relating to Shetland's textile heritage.

'C Archives TMA': T. M Adie & Sons archives are split between the SMA, which has the business records and managerial material and the Shetland Museum store (SM Store) that has the textile material relating to the production of Fair Isle, and Shetland tweed.

This Shetland textile manufacturer closed its doors in the early 1990s, and donated their company's sampling material, sales information, business records, marketing and advertising material. Concerning tweed, there was a back catalogue of tweed sample books, swatches and fabric lengths and Shetland wool colour cards. This collection spans 100 years between the 1890s to the early 1990s. This research concentrates on the sixty-year period between the late 1900s through to the end of the 1960s. At the time of the fieldwork conducted for this research (between Oct' 2010 and Oct' 2015) there was no other comparable tweed collection on Shetland.

'D Making': The industry partner ASF Shetland provided studio space on their premises at Sellafirth in Yell, where the author conducted the majority of the knitting and weaving practice between May 2011 and July 2012.

3.3.2 Clusters

The clusters have been numbered cluster 1-8. The eight clusters fell into three groups: (1) cluster 1-3 covered fieldwork methods, (2) cluster 5-7 covered reflection-in-action methods, and (3) cluster 4-8 covered reflection on reflection-in-action methods. Table 3.1 presents a summary of the objective of each cluster and their allocated number.

Table 3.1 Organisation of inquiries through the clusters

inquiries	cluster	nature of work	cluster objectives
'A Landscape' (exploratory)	1	fieldwork	Shetland as an open landscape and the details within
	5	reflection-in-action	focus material covering Yell, organise to find the correlations
'B1/B2 Collections' (exploratory)	2	fieldwork	collections in SMA, UHC & BH, TM collections gathered from the landscape
	6	reflection-in-action	organise the material to find the correlations
'C Archives TMA' (exploratory)	3	fieldwork	documenting TMA in the SM Store & SMA
	7	reflection-in-action	organise the material to find the correlations
'D Making' (practice)	4	reflection on: reflection-in-action	investigate Shetland wool: qualities, shades
	8		investigate tweed: shades and pattern

3.3.3 Outcomes, makes and matrix

The nature of the outcomes 1-10, makes 1-5 and matrix U, V-Z and T, were dependant on their cluster in relation to fieldwork or type of reflective work. Thus, when the research was going through the exploratory inquiries the outcomes from fieldwork were a series of practice-based studies or gathered archival material, whereas the outcomes from the reflection-in-action work were organisational, and as a result of assessing the studies and material collected. The data from all the reflection-in-action and fieldwork outcomes was collated into matrix U which in turn generated a further five matrix V-Z that accompanied each of the five makes. The makes were constructions from reflection on reflection-in-action and concluded each of the action-led cycles 1-3. The fourth action-led cycle was reflection-in-action that gathered a more focused range of archival material, resulting in outcome 10, and the data was collated into matrix T for analysis. This description of the research structure outlines the flow the research took as it moved across the inquiries and through the four action-led cycles, set out in Table 3.2 (see visual diagram of this flow, Appendix B)

Table 3.2 Conducting research through the four action led-cycles

inquiry	**cluster**	**nature of work**	**outcomes 1-10 matrix U, makes 1-5 matrix V-Z, matrix T**		**action-led cycles 1-4**
B2 Collections	2	fieldwork/practice	outcome 1	matrix U	**1**
A Landscape	1	fieldwork/practice	outcome 2		
C TMA	3	fieldwork/archival	outcome 3		
D Making	4	reflection on:	make 1 + matrix V		
B1 Collection	2	fieldwork/practice	outcome 4	matrix U	**2**
B2 Collection	2	fieldwork/practice	outcome 5		
A Landscape	5	reflection-in-action	outcome 6		
C TMA	3	fieldwork/archival	outcome 7		
D Making	4	reflection on:	make 2 + matrix W		
D Making	4	reflection on:	make 3 + matrix X		
B1/2 Collection	6	reflection-in-action	outcome 8	matrix U	**3**
C TMA	7	reflection-in-action	outcome 9		
D Making	8	reflection on:	make 4 + matrix Y		
D Making	8	reflection on:	make 5 + matrix Z		
C TMA	7	reflection-in-action	outcome 10	matrix T	**4**

3.4 Methods applied through the research

As previously intimated, Schon's identification of reflective work as reflection-in-action and reflection on: reflection-in-action has influenced this author's approach to research and has proved well-matched to the methods of research that were adopted: personal observation and reflection-in-action detailed through a reflective journal, visual documentation, and interviews, classified by cataloguing, codes and the process of coding.

Reflection on: reflection-in-action, detailed through making was found in knitting and weaving. A summary of these methods and where they were used within each cluster are laid out in Table 3.3. In the following sections each of these methods are discussed in more detail.

Table 3.3 Summary of methods used through the clusters within each inquiry

Inquiries	cluster	nature of work	methods used to conduct the research within each cluster
'A Landscape'	1	fieldwork	reflective journal photography drawing
	5	reflection-in-action	reflective journal cataloguing, coding matrix to support documentation
'B1/B2 Collections'	2	fieldwork	collect primary source material reflective journal photography drawing
	6	reflection-in-action	reflective journal cataloguing, coding matrix to support documentation
'C Archives TMA'	3	fieldwork	reflective journal interviews (unstruct') collect primary source material photography
	7	reflection-in-action	reflective journal cataloguing, coding matrix to support documentation
'D Making'	4	reflection on: reflection-in-action	matrix to visualise correlations making: knit/weave reflective journal photography
	8		

3.4.1 Reflective journal

In a practice-based context the reflective journal provided a space for interchange between objective and experiential approaches to both field and reflective work:

> '…a melting pot for all of the different ingredients of a research project, prior experience, observations, readings, ideas – and a means of capturing the resultant interplay of elements' (Newbury, 1996, p. 3).

It has been understood as a 'store - a depository for a range of information…which is added to and consulted on a regular basis' (Gray & Malin, 2004, p. 59) and in this research, the reflective journal has been an overarching method used across all four inquiries. It took written rather than digital forms in a series of notebooks to hand throughout all the field and reflective work, collecting a diverse range of responses from fleeting ideas and initial impressions to studies on methods, initial documentation of

archival material, comments on contextual literature and descriptions of walks and experiences in the Shetland landscape. In order to refer to these varied types of reflections and observations through this thesis the author has used the overarching description written responses where the author has been intuitive to the research context and in some cases has quoted the written response from the reflective journal referenced as RJ and the date.

Reflective journal as a reference tool

All the entries across these various notebooks were dated, page numbered and labelled dependant on type (e.g., field/reflective, inquiry/cluster/outcome). They were then organised into two collections of writing: inspiration and context.

The collection of writing for 'inspiration' relating to 'A Landscape' and 'B1 Collections'. This also included all the practical work conducted in 'D Making' that was in direct response to experiencing the landscape.

The collection of writing for 'context' referred to 'B2 Collections' and 'C Archives TMA' This also included all the practical work conducted in 'D Making' that was in direct response to the archive and museum context.

These two collections of writings were then organised separately into folders labelled Inspiration and Context and filed sequentially by date. Correlations could then be made through the research as developing ideas were followed and collated together.

These were supported by an index, which listed each written item that was filed in this system with its relevant reference information, as already described: date created, detail of writing, format, cluster, fieldwork (FW) or reflective work (RW), location in folder. An extract from the CT index is shown in the Table below.

Table 3.4 Extract from the CT index to access catalogued written commentaries

Record No.	Date entry	Detail	Format	Inq	Cluster	FW/RW
CT 15	10-02-11	reflection on 3rd day to SM store	Reflective J. p. 64-65	C	CL 3/7	FW2
CT 16	15-02-11	How did weave fit into a knit dominant culture?	Written notes	C	CL 3	RW2
CT 17	15-02-11	Shetland: good variety natural colours	Reflective J. p. 68	D	CL 4	RW2
CT 18	16-02-11	Key findings from FW2 looking at TMA collections	Typed notes	A/B/ C/D	CL 1/2/3/4	RW2

3.4.2 Visual documentation

Photography

The use of photography in research has been described in a way which suggests this method is much more than a simple process of recording:

> 'Photographs evoke meanings and reflections as well as information and factual data…. They carry documentary and interpretive meaning, either posed or natural. They can support and supplement other sources of data and text, or they can stand alone.' (Cohen et al, 2011, p. 530)

The importance of photography in this research has been across the four inquiries from carrying factual data to being open for interpretation and, importantly, they all have one thing in common: the author made all the photographs during fieldwork. A researcher's own photographs can be a vital research tool to generate information to be studied, either as 'supporting' in contributing evidence to answer a research question or 'supplemental', acting almost as stand-alone images of explanation within the research project (Rose, 2010; Cohen et al, 2011). Across the four inquiries here, the part the photographs played has been characterised as 'supporting' but the support provided has varied in nature and needs to be clarified.

In 'A Landscape' photography was used to document the experience of travelling through and living in the Shetlands. The photographs were a vital way to capture particular panoramas and the details within them. This group of photographs created a digital catalogue of images which contributed to fieldwork in cluster 1 (Table 3.1, documenting the Shetlands as varied open landscapes), shown in Fig 3.1

(a)  (b) 

Figure 3.1 examples of photographs documenting 'A Landscape'/ cluster 1. (a) cliffs at Eshaness, (b) and the details within, a cliff top rock plant (2011)

In ‘B1/B2 Collections’ photography was used in a supporting role to record the collections that were drawn (drawing as a method is discussed in the following section) in the museums and gathered from the landscape. This group of photographs created a digital catalogue of images which contributed to fieldwork in cluster 2 (Table 3.1, documenting textile museum displays and collections gathered from the landscape) (Fig 3.2).

(a)

(b)

Figure 3.2 examples of photographs recording B1/B2 Collections’/cluster 2 (a) B1: crab claw and seashell, (b) B2: knitted lace socks on display at UHC, (2011)

In ‘C Archives TMA’, photography was used to record all the primary source material (PSM) that was examined at the SMA and SM store. The photographs were vital in keeping track of the changing characteristics of their tweed over the sixty-year period studied. This group of photographs created a digital catalogue of images, which were significant to the fieldwork in cluster 3 (Table 3.1, documenting TMA in the SM store and SMA) (Fig 3.3).

Figure 3.3 examples of photographs recording ‘C TMA Archives’/ cluster 3: TMA tweed: (a) 1910s, (b) 1936, (c) 1956, (d) 1970s (2011)

In ‘D Making’ the photographs were used to document all the samples that came from the knitting and weaving studies: makes 1-5. These contributed to the reflection on reflection-in-action (Table 3.1): cluster 4 (Shetland wool, quality and shades) and cluster 8 (tweeds, shades and pattern) (Fig 3.4).

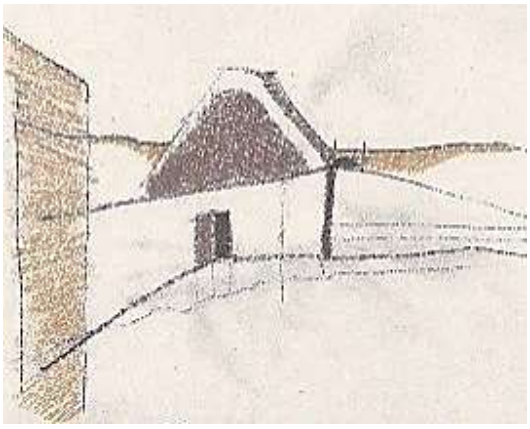
(a)

(b)

Figure 3.4 examples of photographs documenting ‘D Making’ /cluster 4 & 8: (a) example from make 1 knitting study/cluster 4 (b) example for make 5 weave study/cluster 8, (2017)

Drawing

Drawing as part of the design process has been discussed as a crucial activity within such design disciplines as textiles, architecture, and graphics, linking different design stages and developing visual thinking (Purcell & Gero, 1998; Verstijnen et al, 1998; Seitamaa-Hakkarainen & Hakkarainen, 2000; Ingold, 2007; Schenk, 2011). In these instances, these cited researchers observed designers' drawings and identified the different types of drawings conducted at various stages through the design process. In the social sciences, drawing has been used specifically as a visual research tool in conjunction with other methods (Guillemin, 2004). Guillemin observed participators of a research project using drawing as a form of expression alongside being interviewed. The use of drawing has also been acknowledged in anthropology and medicine as a method to record and memorise visual information during fieldwork (Ingold, 2007; Gunn, 2009).

(a)  (b) 

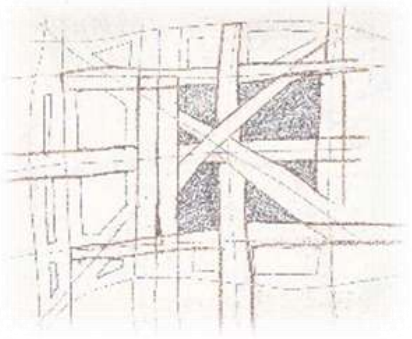
(c)  (d) 

Figure 3.5 examples of subjects photographed and then drawn: (a) a photograph of a croft and its dilapidation, (b) a drawing of it set in the landscape, (c) a photograph of the central weave of a conical, (d) a drawing of its construction (2011)

In this research, the author used the method of drawing as a tool to record and memorise visual material in line with other methods and in so doing the author's impressions were documented. In its entirety, drawing was similar to the use of photography in that it played a 'supporting' role through the research. Crucially, drawings were made after a series of photographs had been taken, which meant that in some cases a subject was recorded within a cluster through each of these methods. Photography provided a period of familiarisation around a subject before drawing was undertaken allowing for an experiential perspective to be recorded. In Fig. 3.5, for example the drawing of a dilapidated croft expressed a sense of isolation in the landscape, whereas the photograph showed more the detail of that dilapidation. In the drawing of the inside of a conical, the eye is drawn to the central weave of the slats whereas the photograph brings the eye back out to the whole construction.

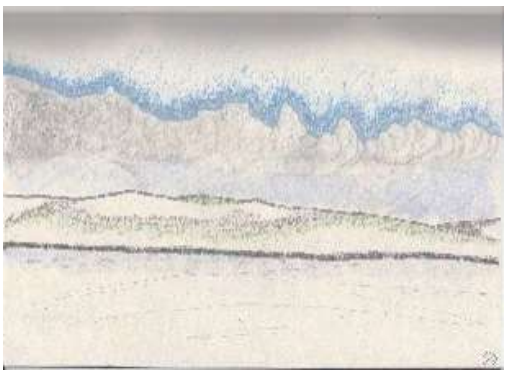
There were however nuances of difference to the nature of the drawings within the inquiries. The author made all the drawings which meant that a form of translation occurred in the process. This kind of translation through drawing has been broken down into different types and purposes,

> '…such drawing might be perceptive and accurate when drawing from life; analytical and interrogative when copying and deconstructing visual sources; and impressionistic, interpretive, or even expressive when seeking visual inspiration' (Schenk, 2014).

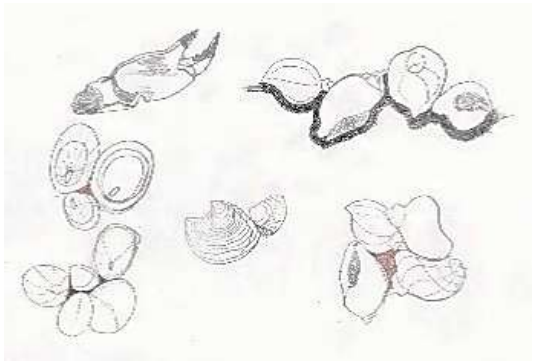
Therefore, reference to Schenk's types and purposes has helped to characterise the use of drawing within each inquiry. These types and purposes have been typed in italics.

In 'A Landscape' and 'B1 Collections' the reason to draw was to *seek inspiration* from the immediate landscape during fieldwork periods. The type of drawing was *deconstructing and recording impressions*. The characteristics of this type was *interrogative, interpretive*. This produced three sets of drawings. The first was of a specific area on the island of Yell (where the author was staying) contributing to cluster 1. The second and third set of drawings were of a collection of seashells and stones that were found in the Shetland landscape contributing to cluster 2 (Fig. 3.6).

(a)



(b)



(c)

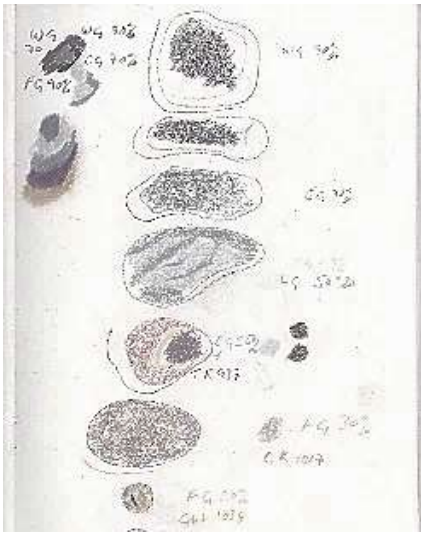
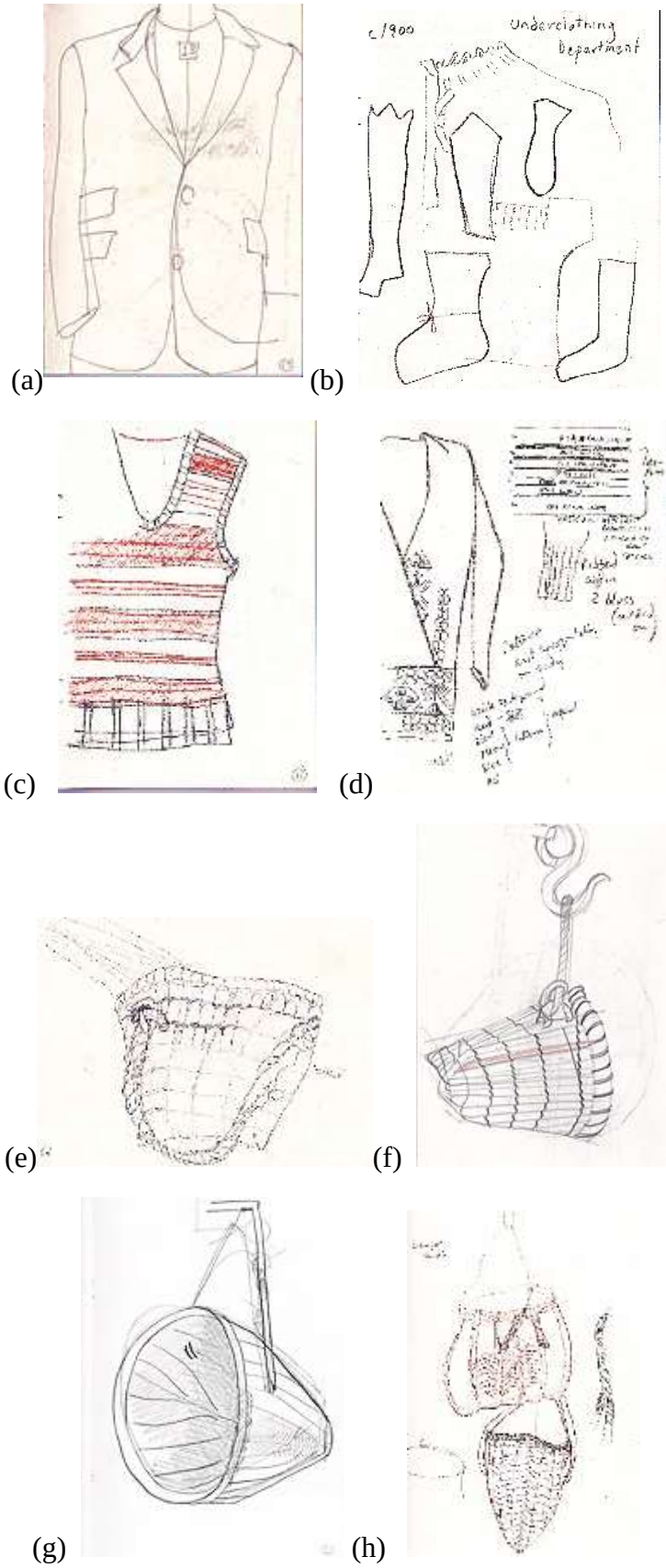


Figure 3.6 examples of drawings to: *seek inspiration*: (a) a view in Yell to capture the mood of the skies (b) seashells collected and drawn considering shape, (c) stones collected and drawn with a focus on colour (2011)

In 'B2 Collections' the reason to draw was to *develop visual awareness* of the relevant items. The type of drawing was *drawing from observation and copying*. The characteristics of this type was *analytical and exploratory*. This produced two sets of drawings, the first set was of the textile collection displayed in SMA and the second set was of the display at the UHC&BH. Both contributed to CL2 (Fig. 3.7).



(a) (b) (c) (d) (e) (f) (g) (h)

Figure 3.7 examples of drawings to: *develop visual awareness*: at the SMA: (a) a tweed jacket on display, (b) knitted 19th century underclothing, (c) the shape of a Fair Isle tank top, (d) a detail of a Fair Isle interpretation on a lady's jumper; at the BH: (e) to (h) are drawings of kishie (hand-made Shetland baskets) (2011)

Visual documentation as a reference tool: catalogues (digital format)

Catalogues in this research are repositories (Kirshenblatt-Gimbett, 2004; Loh et al, 2016) for different groupings of visual material, digitally stored. All the visual documentation for the exploratory inquiries was initially organised into three separate catalogues: Catalogue Inspiration, Catalogue Inspiration/Context and Catalogue Context. Within each of these catalogues the groupings of visual documentation were further organised into categories (CAT) and where required, sub-categories.

- In Catalogue Inspiration went all the visual material relating to 'A landscape'. These were initially categorised by places visited across Shetland.
- In Catalogue Inspiration/Context went all the visual material relating to 'B1/B2 Collections' these were categorised by the author's own collections and the museum display collections.
- In Catalogue Context went all the visual material relating to 'C TMA Archives'. These were initially categorised by the different archive visits.

In Catalogue Inspiration, 'A landscape' was organised into six categories (CAT 1-6) that related to the different places in the Shetlands that were explored at random (as described in section 3.3.1). They have been numbered in the order that these places were initially visited. The photographs within each category were numbered in the order that they were taken. Some of these places were visited more than once.

- CAT 1: Yell (Island between Mainland and Unst where the author stayed)
- CAT 2: Lerwick (Mainland)
- CAT 3: Unst (most northerly island)
- CAT 4: Eshaness (north west Mainland)
- CAT 5: Muckle Roe (Mainland)
- CAT 6: Walls (south Mainland)

CAT 1: Yell, where the author would stay, was the most documented of these various landscapes covering changing seasons and weather more consistently, and so it became the focus for reflection-in-action in cluster 5 (organise the material to find correlations) and the content for outcome 6 (Table 3.2).

In Catalogue Inspiration/Context 'B1/B2 Collections' was organised into one category (CAT 7) that encompassed collections in the museums and collections from the

landscape, becoming the focus for reflection-in-action in cluster 6 (organise the material to find correlations) and the content for outcome 8 (Table 3.2).

- CAT 7: Collections in the museums and from the landscape

In Catalogue Context 'C Archive TMA', it was accessed four times and each time a different part of the archive was studied, it was treated as a separate category (CAT 8-11).

- CAT 8: SM store 1/TMA tweed
- CAT 9: SM store 2/TMA varied textiles
- CAT 10: SMA 3/TMA business documents,
- CAT 11: SM store 4/TMA colour use in tweed

CAT 8 became the focus for reflection-in-action in cluster 7 (organise the material to find correlations) and the content for outcome 9 (Table 3.2). CAT 9 and 10 contributed to understanding the TMA context. CAT 11 became the other focus for reflection-in-action in cluster 7 and the content for outcome 10 (Table 3.2), discussed separately in chapter 6.

This visual material received the same labelling system across all three catalogues. A visual item (photograph or drawing) was given two sets of initials. The first set was to identify the cluster it related to with initials e.g. CL1 or CL2 etc. The second set was to identify the method that produced the visual item: photographic record (PH) when documenting the landscape, primary source collection (PSC) when recording the archive material, observational study (OS) was used for all drawn studies. Then finally, each image received a number in order of date produced within its relevant CAT.

These catalogues became very useful as a way of easily accessing the visual material, especially when it came to focusing the research attention on CAT 1 for outcome 6, CAT 7 for outcome 8, CAT 8 for outcome 9 which were coded in detail (see section 3.4.4) providing correlative material in relation to 'D Making'. These particularly focused categories are discussed as the main body of work for the exploratory inquiries in chapter 4.

3.4.3 Interviews

A series of three interviews took place during the fieldwork. These interviews contributed to a clearer understanding of the PSC retrieved in 'C Archive TMA'. The purpose of these interviews was to gain first-hand insight, into the recording, sampling and manufacture of Shetland tweed at TMA. These were with James Adie (Appendix B). He was the nephew of Thomas Adie and he looked after the manufacture of tweed at TMA from 1946 until it closed in 1992. He and his wife Anne donated the TMA archives to the SMA and the SM store.

The type of interview conducted each time was qualitative and unstructured as the information that was collected was somewhat anecdotal, relying on memory and stories. Unstructured interviews have been described in the following way,

> '…there is an incomplete script. The researcher may have prepared some questions beforehand, but there is a need for improvisation. The interviewer is the researcher…' (Myers and Newman, 2007, p.4).

The interviews therefore were treated as a series of informal meetings, eliciting information through an open-ended conversation. The only structure to the proceedings was that prior to the start of each interview an objective was set as to what kind of information was wanted from the interviewee.

Notes were taken during the interview and then transcribed on to an interview record sheet, which documented the name and occupation of the interviewee, the date, time and duration and place of the interview and finally the purpose and topics discussed. An example of the interview record sheet is in Table 3.5

Table 3.5 Interview record sheet

Name:	Occupation:	
Date:	Time:	Duration:
Place:	Purpose:	
Type of meeting:	Record format:	
Account of meeting/interview:		

3.4.4 Codes and the process of coding

The author's impressions of and interaction with the research context were collated into written responses in the reflective journal. These writings interrelated implicitly with the accumulative visual material. Therefore, to make this implicit connection more

explicit the written responses were coded, and these codes were attached to the related visual material. Codes have been described as 'labels that assign symbolic meaning to the descriptive or inferential information compiled during a study' (Miles et al, 2014, p. 71). In this way the visual material once coded could be sifted into thematic groups in relation to the developing ideas,

> 'We *construct* our codes because we are actively naming data- even when we believe our codes form a perfect fit with actions and events in the studied world. We may think our codes capture the empirical reality. Yet it is our view: we choose the words that constitute our codes. Thus, we define what we see as significant in the data and describe what we think is happening' (Charmaz, 2006, p. 47).

This process was relevant to the research because of the way in which it made explicit the implicit nature of the author's observations and perceptions. As an example, a series of photographs (Fig.3.8) that followed a storm to its end were connected to a written description of the experience,

> '*I spent the first few days of my visit stuck inside the croft* [Midhouse]*...because of the bad weather. My desk looked out across a field to sea* [Basta Voe] *.... On the third day we finally got out and the weather had calmed down*.' (IN 3, 19/12/10).

(a)  (b)  (c) 

Figure 3.8 a series of photos recording a storm, coded 'Inside-out': (a) looking across Basta Voe during the storm, (b) the storm starts to pass, and (c) after the storm had cleared (2011)

This connection resulted in the descriptor ‘inside-out’ which was a progression from ‘stuck inside’ to better describe the experience of staying in a croft for a significant period of time and looking out at the surrounding open landscape, engulfed by a storm. This initial descriptor set in motion further codes in response to the detail e.g. place, the effect of the light, time of year. Another example is of a descriptor that started in a set of drawings of the landscape labelled ‘linear routes’ used to describe and trace the sense of perspective found in a Shetland view. This was picked up on when the drawing studies turned to the collection of sea shells and stones (Fig. 3.9). This unified an aspect of the author’s response to each set of drawings between different scales of perspective.

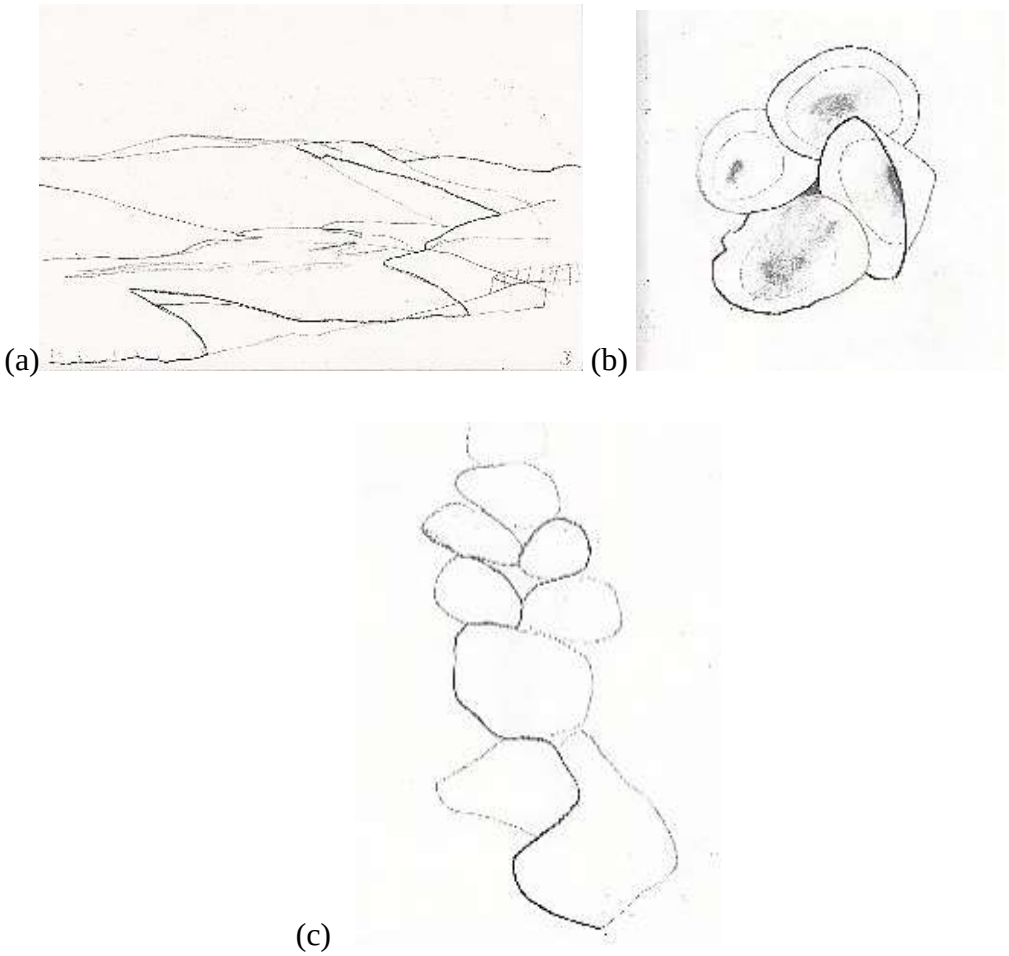


Figure 3.9 a series of drawings coded linear routes (a) in a landscape, (b) around some shells, (c) down some stones (2011)

Therefore, where the author’s position to the research has been reflexive, the use of codes was very helpful in how the visual material, most particularly in the focused categories (CAT 1: Yell; CAT 7: Collections; CAT 8: SM store, TMA tweed), was

thought about, related to and contextualised. The codes provided a heightened awareness of the material and the ability to cross-reference that awareness across all four inquiries.

Inevitably, there is a process to coding, to select and assign codes to data, which is cyclical. It works through material repeatedly to categorise and name it, each time with more detail, using different types of codes to focus the study, (Saldana, 2009; Charmaz, 2006). The type of codes used for this research were: categories (CAT), sub-categories, factors and descriptors.

- Categories (CAT): (already referred to in section 3.4.2) identified with the wider scope of the research, naming the different places or areas of study that were considered.
- Sub-categories were more specific to subjects within a single category.
- Factors were codes that named objects and facts directly drawn from within each individual piece of written and visual material in CAT 1, CAT 7 and CAT 8.
- Descriptors were in relation to describing impressions drawn from within each individual piece of written and visual material in CAT 1, CAT 7 and CAT 8.

In the cyclical coding process, the early exploratory coding was reliant on the categories and sub-categories, which set up Catalogue Inspiration, Catalogue Inspiration/Context and Catalogue Context. When the coding cycles became more in depth for the focused categories CAT 1, CAT 7 and CAT 8 it resulted in factors and descriptors organised by thematic groups:

CAT 1: Yell for 'A Landscape' (Table 3.6), there are three types of factors: (1) season and time of day, (2) places specific to Yell and (3) nouns; there are three types of descriptor: (1), characteristics (2) atmosphere and (3) colour.

CAT 7: collections for 'B1/B2 Collections' (Table 3.7), there are two types of factors: (1) textile and (2) crofting; there are two types of descriptors: (1) colour and (2) effect.

CAT 8: TMA tweed for 'C Archive TMA' (Table 3.8), there are two types of factors: (1) range books and (2) details; there are two types of descriptor: (1) colour and (2) effect.

Tables 3.6-3.8 present CAT 1,7 and 8 shaded in grey with their assigned sub-categories shaded in pale blue, factors typed in green, and descriptors typed in red.

Table 3.6 Coding lists for CAT 1:Yell, ‘A Landscape’

CAT 1: Yell				
‘A Landscape’				
sub-categories				
skyscapes land-Sea beach	naturally discarded discarded objects		crofts home	sheep snow flora
factors				
season, time	place	nouns		
winter summer morning midday afternoon evening sunset	Midhouse, Cunnister North Ayre Basta Voe Sellafirth, Gutcher North Sea Breckon Cliffs Efstigarth Stuis of Graveland Sandwick, Awick	lichen sea shells fishing boat potato digger tractor shell shards crab shell mussel nets bluebells rock face	croft grass salmon farm footprints cotton grass orchid flower fern cliffs horizon	rainbows peatland clouds coastline beach stones ferry sea view skyline
descriptors				
characteristics		atmosphere		colour
treeless cluster inside-out derelict scattered marbling land-sea-sky dilapidated remoteness open landscape depth linear route linear form		bright sunlit stormy vibrant dark overcast silhouetted sunbeam windy stillness contrastive		pink yellow red purple white green pale pink pale blue grey colourful

Table 3.7 Coding list for CAT 7: Collections, ‘B1/B2 Collections’

CAT 7: collections		
‘B1/B2 Collections’		
sub-categories		
museums (SMA/ UHC&BH/ TM)		author’s
Fair Isle knitted jersey tweed Unst Fair Isle		seashells beach stones wool
factors		
textile		crofting
Unst women rowers spinning chair lace yarn hank winder hank stretcher loom	tweed scarf lace baby jacket lace socks lace bag knitted baby jacket allover pattern Fair Isle socks	pattern on wood hem for sheep potato planter ropes and knots boat panels coracle stencils
descriptors		
colour		description
Shetland shades natural shades creams-beiges-browns-greys creams-beiges-browns beiges-browns-greys cream-beige-grey creams- beiges creams-browns creams-greys browns-greys beiges-browns creams browns greys blue		dark to light contrasting shaded linear forms linear route layering depth interlacing intertwine entwine size-shade-shape shadows

Table 3.8 Coding lists for CAT 8: SM store 1/TMA tweed, ‘C Archive TMA’

CAT 8: SM store 1/TMA tweed	
‘C Archive TMA’	
sub-categories	
TMA sampling	
range books range cards range cloths	colour cards tweed woollens blankets designs
factors	
range book names	details
Invoice Book Book 1 Book 2 Book 3 Book 4 Book 42 W. Bill 1 W. Bill 2 H. Freeman Inc F & L Inc W.O. Peake House Mead & Sons Clients varied 1 Clients varied 2 Clippings 2207-2333,	overcoating heavyweight coatweight featherweight lightweight special lightweight zephyr standard tie-cloth common twill herringbone handspun lovat designer names client order notes colour notes peg notes over-check london shrunk light-medium-dark
descriptors	
colour	effect
Shetland shades mixed with naturals coloured blues	depth highlighting blending shading contrasting

3.4.5 Matrix U: correlation of coding through the factors and descriptors

Matrix U tabulated the most recurring factors and descriptors coming out of the written and visual documentation from the focused categories CAT 1, CAT 7 and CAT 8 as they occurred in relation to the sequence of the makes 1-5 in 'D Making' (Table 3.9). Miles et al (2014, p.109) have described a matrix as '…essentially the "intersection" of two lists, set up as rows and columns. Its role is to manage and make more visual collections of coded data to analyse in a variety of ways (Gray & Malin, 2007; Miles et al, 2014). Matrix U was used as a tool to show more explicitly how the process of coding evolved and correlated across the inquiries as the research went through acion-led cycles 1, 2 and 3 (Table 3.2).

In retrospect, the activity of making that took place at the end of each action-led cycle was in response to the accumulating factors and descriptors. This pattern of work exemplified the tacit response the author had with the exploratory inquiries in preparation for the experimentation of each make. It also showed in incremental stages the accumulation of understanding through the research.

Matrix U was organised with horizontal coordinates 1-6 along the top listing the inquiries A-D, and vertical coordinates down the left side A-E listing the action-led cycles 1-3. In the relevant matrix squares were put the factors in green and the descriptors in red that had accumulated relevant to each stage of 'D Making'. The factor and descriptor coding can be read horizontally in relation to each make and vertically in relation to the focused categories CAT 1, CAT 7 and CAT 8 (Table 3.9).

Crucially, each matrix square houses a set of codes representative of the visual documentation they have been assigned. When matrix U is read horizontally row by row a body of visual material can be correlated in line with the make on that row. In so doing a further five sub-matrix labelled V-Z were constructed as laid out below.

- coordinates A1-A5 = matrix V correlating with make 1/coordinates A6
- coordinates B5 = matrix W correlating with make 2/coordinates B6
- coordinates C1-C5 = matrix X correlating with make 3/coordinates C6
- coordinates D1-D5 = matrix Y correlating with make 4/coordinates D6
- coordinates E1-E5 = matrix Z correlating with make 5/coordinates E6

Each horizontal row of coordinates listed above drew between forty-five and seventy-six visual references from CAT 1/Yell, CAT 7/collections and CAT 8/SM store 1, TMA tweed.

Table 3.9 Matrix U, alignment of coding across the inquiries

	0	1	2	3	5	6
	action-led cycles	'A Landscape' CAT 1: Yell	'B 1 Collections' CAT 7: author's	'B2 Collections' CAT 7: museums	'C Archive TMA' CAT 8: samples	'D Making'
A	1	sheep, wool open landscape land-sea-sky, treeless	seashells dark to light, cream-beige- brown-grey shadows	tweed, lace, Fair Isle, rowers seashells dark to light cream-beige- brown-grey shading, blending Shetland shades	range cloths	**make 1** knitted swatches: Shetland shades study
B	2				range book range cards: over/heavy/coat featherweight, l'tweight special lightweight, zephyr, standard, tie-cloth	**make 2** 1st woven study: quality
C		remoteness dilapidated, Midhouse summer, naturally discarded objects, croft, potato digger scattered, derelict	seashells natural shades, creams, beiges, browns,	birds' eggs, seashells, boat panels natural shades, creams, beiges, browns,	range cloths range book blending, shading, light-medium-dark	**make 3** 2nd woven study: Shetland shades and dyed colours
D	3	winter inside- out depth Gutcher	seashells depth contrastive, interlacing	Fair Isle, Lace, ropes & knots depth contrasting interlacing	Herringbone shading contrasting	**make 4** 3rd woven study: pattern and Shetland shades
E		linear route	seashells linear route layering	ropes & knots depth layering, linear route	range books contrasting, depth, highlighting,	**make 5** 4th woven study: pattern and Shetland shades

The related visuals to the factors and descriptors drew out substantial images and references which in some cases were repetitive in what they portrayed so these were edited down to more manageable numbers to read more succinctly against the aligned makes. It was ascertained that there were on average about four visuals per code. The final edit therefore drew out about a quarter of the total visuals which equated to three

groups of sixteen images, one group of twelve, and one group a sixth of its total with just eight images.

Table 3.10 is a list of each of the coordinates from matrix U establishing matrix V-Z, numbers of images collected through the codes and the final edited groups. Reading from left to right it shows the total number of images generated aligned to each of the coordinates, and factors and descriptors counted separately. It then shows the average number of images per code (factors and descriptors), the final edit of images selected and the related makes.

Table 3.10 Alignment of edited images for each make in preparation of matrix V-Z

matrix U coordinates and sub-matrix matrix V-Z	No. images	No. factors	No. descr'tors	images per code	final image selection	reference to make
A1-A5: matrix V	76	8	9	4.47	16	make 1
B5: matrix W	49	12	0	4.1	8	make 2
C1-C5: matrix X	76	10	9	4	16	make 3
D1-D5: matrix Y	45	7	6	3.46	12	make 4
E1-E5: matrix Z	76	10	10	3.8	16	make 5

Matrix V-Z are presented in chapter 5 alongside each related make in tables 5.2 (matrix V), 5.6 (matrix W), 5.10 (matrix X) 5.15 (matrix Y) and 5.18 (matrix Z). In Table 3.11 is the template for these matrices. Starting from the top of the template, each one can be identified by the coordinates from matrix U. Each matrix is given a title, which is referred to as an essence to describe the characteristics of the accumulated visual and written material. Next is listed horizontally the inquiries and underneath the related descriptors in red. To the right vertically is listed the factors in green. The remaining sixteen squares are for the visual material selected as explained in Table 3.10.

Table 3.11 Template for matrix V-Z

matrix U coordinates:	'title/essence'			
inquiry:	'A'/CAT 1 (Yell)	'B1'/CAT 7 (author's)	'B2'/CAT 7 (museums)	'C'/CAT 8 (TMA)
descriptors / factors				

3.4.6 The activity of making: knitting and weaving

The activity of making was a responsive process led by the developing understanding acquired through the exploratory inquiries, signposted by the coding. In so doing a pattern of work developed so that it was conducted at the end of each action-led cycle. The makes therefore have been aligned to related accumulations of factors and descriptors that in turn made more explicit the essence of understanding that evolved from this work, expressed through matrix V-Z. Chapter 5 discusses this qualitative aspect.

A more practical question was to ask what kind of methods of making could be retrieved from researching 'C Archive TMA' and whether these methods could be implemented within the activity of making to start to break down the characteristics of the tweed from a constructivist perspective.

> 'The constitutive rules of a craft are only learned by actually doing the activity. Indeed, they are the activity. This is a fundamental point about craft knowledge. You cannot understand it or know it until you can do it.' (Dormer, 1994, p.42)

The rules in this sense were the parameters within which TMA worked to develop their tweeds. Such parameters have also been described as an intuitive dialogue between the crafter and his craft (Dormer, 1994; Brunell, 2000). Loh et al (2016) have referred to these rules in the context of Pye's theory of workmanship of risk as an interrelation of elements, which are tools, techniques, and materials. Their approach provided a way of measuring the kind of knowledge required through the conduct of making within a craft.

The author structured the making process around these three elements as they were drawn from the research material. Each make was then able to be considered as a form of 'three-dimensional experimentation' (Grays & Malin, 2004, p.112) and evidence of a process of thinking (Harrison, 1978, p. 201) through the activity of making to better understand the TMA context. The following sections establish the tools (Table 3.12) the author adopted to conduct her practical experimentation, the material selected and the techniques that were used in the process.

Table 3.12 Tools that were used through the practice of knitting and weaving

practice	**hand knitting:**	**weaving:**
tool	1) knitting needles size 8	1) AVL dobby loom/ twenty-four shafts 2) Harris loom, table top,/4 shaft
construction	stitch: jersey (purl/plain)	weave: 2x2 twill, herringbone or tabby.

Material: wool brokers' Shetland wool

The Shetland wool brokers, Jamieson & Smiths (J&S) have a long-standing relationship with over 700 crofters and farmers in Shetland, having collected around 80% of the Shetland wool clip since the 1930s (Jamieson & Smiths, (s.d)). In 2005 Curtis Wool Direct, an international wool spinner based in Yorkshire, joined forces with J&S. The wool clip is sorted by shade and quality in Shetland at the premises in Lerwick and then it is sent to the spinning facility in Yorkshire. J&S have played a significant part in the Campaign for Wool in the UK each year and Shetland Wool Week in Shetland every September. Their main emphasis has been in promoting the wool they collect and spin as being 'Real Shetland Wool' carrying the '3 sheep' logo (Henry, 2013). Their core yarn collection is woollen spun for knitters. However, in recent years they have developed worsted spun qualities for knitting which can also be used for weaving.

Yarn Selection and Shetland natural colour names: The three J&S qualities selected for this research were jumper weight (JW), lace weight (LW) and extrafine weight (EW) (Fig. 3.10). These are listed in Table 3.13 alongside the range of natural colours offered in each of the qualities at the time of purchase in 2011 and 2012. The natural colours are listed in their Shetland name (Shetland black, moorit, sholmit, mooskit, white, gaulmogit, katmollet, shaela and yuglet) alongside a more common description of the shade and a representative colour block.

In comparison the TMA shade cards (Fig. 3.11) covered what appeared to be three different periods from about the 1940s to the early 1990s. This was apparent in the change in style of presentation of each of them. There were nine shades which had each been given a name: white, 1 grey, 3 grey, 3 ½ grey, 4 grey, black, fawn, morrit and brown. Two further shades had been added on the later shade cards 1980s-1990s: mooskit and light morrit with morrit renamed as dark morrit. Table 3.13 show these TMA shades alongside the J&S shades.

This review is to illustrate what was available to the author to use, as opposed to what had been available to TMA, to identify the limitations of the make experiments. The main observation from this comparison is that TMA had for weaving a range of nine woollen shades in the 1950s and 1960s closest to the woollen jumper weight range J&S offer today with one difference. J&S have a Shetland black which is a traditional dark brown, whereas TMA had a black which is apparently dyed black even though it is

listed with the Shetland shades. The J&S worsted lace weight and extra-fine weight only offer five of the nine shades J&S have in the jumper weight, which reduced the scope of shading possibilities the author had to work with. This limitation did not affect the approach or understanding through the experimental work, but it did affect variety through example.

(a)  (b) 

Figure 3.10 J&S shade cards: (a) jumper weight, (b) left: lace weight, right: extra-fine (2015)

(a)  (b)  (c) 

(d)  (e)  (f) 

Figure 3.11 TMA shade cards: (a) 9 shades 1940s-mid 60s , (b) close up shades: 1940s-mid 60s: white and greys 1-4, (c) close up shades 1940s-50s: black, fawn, morrit and brown, (d) 9 shades 1960s-70s shades, (e) 6 shades 1980s-early ‘90s : white and greys, (f) 5 shades 1980s-early ‘90s : browns (2011)

Table 3.13 A comparison of J&S and TMA Shetland wool shades on the colour cards

common name	shade	J&S jumper weight	J&S light-weight	J&S extrafine weight	TMA shades 1950's-60's	TMA shades 1991
dk brown		Shet' blk	Shet' blk	Shet' blk	brown	brown
brown		moorit	moorit	moorit	morrit	dk morrit
beige		sholmit	sholmit	sholmit	fawn	fawn
cream		white	white	white	white	white
pale grey		gaulmogit			1 grey	1 grey
light grey		katmollet			3 grey	3 grey
mid grey		shaela			3 ½ grey	3 ½ grey
dark grey		yuglet	yuglet	yuglet	4 grey	4 grey
black					black	black
dusk		mooskit				mooskit
dk sand						lgt morrit

Techniques

A mode of practice that was fundamental to the Scottish tweed industry was range making which has been described in the following way:

> 'This time [the designer] will aim to produce a piece of cloth, say, 30 inches wide divided into five patterns 6 inches wide and say, a yard long…. He decides to arrange for a grey, a couple of browns, and a dark green. The first 6 inches of his "Range" will display his black and white ground; his second, grey and white, possibly with blue for the over-check….and so forth to the completion of his scheme…. The weaver then weaves, say 7 inches of each. The results of all this activity is a piece of cloth 30 x 36 inches consisting of twenty-five squares of cloth of which five are "perfects" and twenty are various "cross effects", which may or may not be good according to the type of design that has been the base of the range. ...Next, this collection of "Ranges" forms the season's "pattern set", and they are taken round the distributors to let them choose their styles.' (Harrison, 1956, p.46)

TMA being a member of the NASWM had adopted this practice and examples of such range cloths were in the SM store (Fig 3.12).

(a)

(b)

(c)

Figure 3.12 examples of TMA range cloths (a-c) 1930s-40s (2011)

Harrison (1956, p.45) also described a stage before range making which he called the ‘Trial’, which was a cloth of eighteen different designs worked on between the designer and the weaver. It was from this cloth that a design would have been selected for range making. The author came across documentation of trials but no cloths to match the

documentation. This might be a separate area of research into examples of design thinking.

Two other significant components in the TMA archive were the range books and the range cards stored in range files. The initial difficulty was in mastering the system operating between the files, the books and the cloths.

The range books were in effect scrapbooks documenting in relative order through the years the tweed patterns that had been woven. Some of these books were a documentation of the TMA standard tweed designs and some of the books were dedicated to samples developed with specific clients or a group of different clients. Each of the samples were able to be traced to a range file. Every sample made was given a range number and was recorded on a range card with all its technical information from the quality of the tweed to the loom set up and colours used in the range cloth. The range books displayed many interpretations of classic tweed patterns. The most prevalent were the shepherd check, hound's tooth (dog's tooth), and variations on the common twill check, herringbone, reverse herringbone. To a lesser degree there were plain diamond, variations of the herringbone to diamond and half diamond patterns, birdseye, tabby (not strictly a twill but it was very much part of these tweeds), and district checks with the Glencheck, Glenurquart being the most frequently woven. A good proportion of these tweeds were documented as having been hand woven, otherwise the tweeds were woven on 4, 8 or 16 shaft power looms.

This system of range making revealed two methods of working with colour that enhanced the visual appeal: blending and shading. The significance of these methods were in combination with the intrinsic nature of Shetland wool and were more commonly discussed within the practice of Fair Isle knitting,

> 'Another effective practice is the shading of colours in a pattern from light to dark and dark to light. This treatment adds depth and interest to the colour scheme'. (Starmore 2009 p. 69)

More important is the skill in maintaining a distinction between the roles the colours play in keeping the patterns revealed (Starmore, 2009; McGregor, 2003) as is illustrated in Figure 3.13.


(a)


(b)


(c)

Figure 3.13 TMA Fair Isle swatches: (a) light to dark greys, (b) light to dark browns, (c) has a dark to light scale in greys and browns revealing the pattern 1930s-60s (2011)

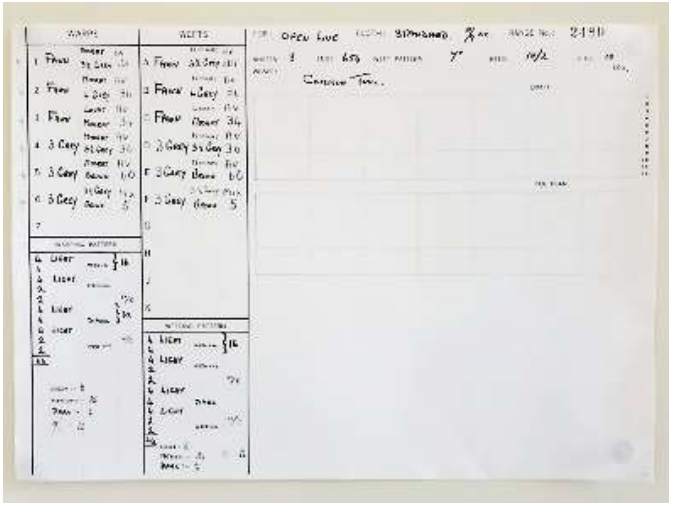
Smith gave an example of this when describing advice on shading given to her by a Shetland knitter,

> ‘Her tips on shading were to keep the background dark or medium dark and change colours where the pattern broadens out. On a seventeen row pattern colours used would be 3, 3, 2, 1, 2, 3, 3, with a centre row picked out in a sharp contrasting colour like the stamen of a flower.’ (Smith and Bunyan, 1991, p. 26)

This consideration to developing a textile not through colours per se but instead through the balance of light, medium and dark (and any variation of this balance: light, medium, light /dark medium, dark, etc) was found on the TMA range cards in many cases when explaining the arrangement of colour for a particular range cloth (Fig. 3.14). Watson in his seminal textbook on ‘Textile Design and Colour’, called this process of colour notation ‘compound orders of colour’ with such an example as: *(3 dark, 2 medium, 1*

light,) 6 times, (1 dark, 2 medium, 3 light) 6 times' (Watson, 1954, p.147-148). This helps to categorise the working methods used by TMA.

(a)



(b)

Figure 3.14 TMA example of light - medium - dark laid out on a range card: (a) a range card documenting a common twill cloth 1950s, (b) close up (bottom left) of the spectrum balance across a warp and weft (2011)

Blending is intrinsically a process that occurs when multiple colours are spun together to make the very Scottish tweed colours known as mixtures. Harrison (1956, p.15) made the point that in creating these mixtures, 'the original colours must…not be divided too minutely to the eye to see them separately- otherwise the result is simply dull, for one colour cancels out the other'.

TMA had their own range of mixtures. These were numbered Mix 1-13 (mix 6 and 8 were discounted) on the colour cards that were from the 1950s -1960s. By the end of the 1980s as with the shades two more mixtures had been added Mix 14 and 15 (Fig.3.15).

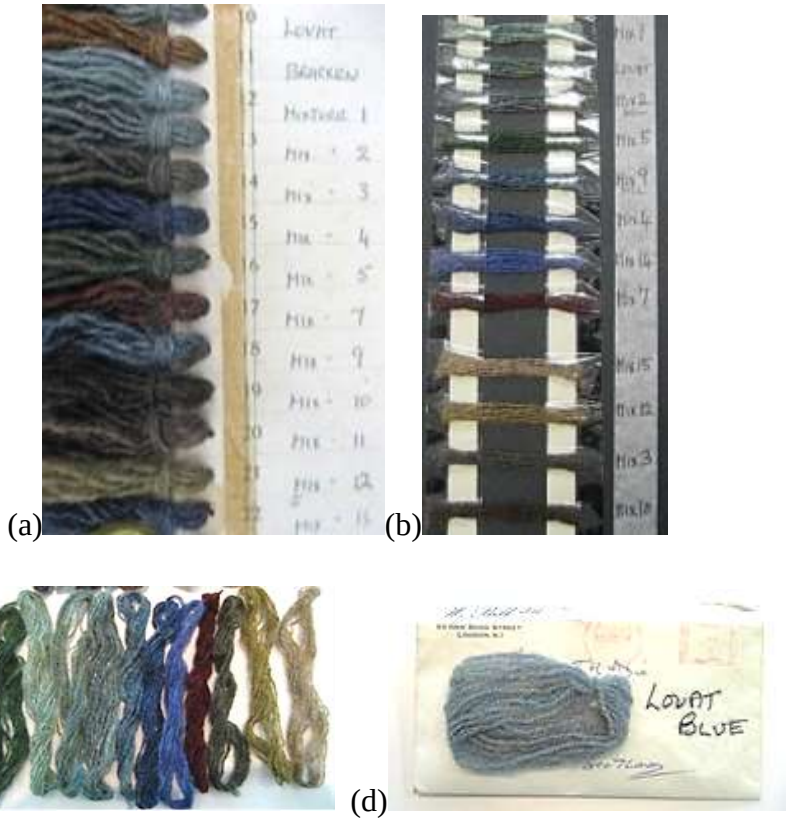


Figure 3.15 TMA mixtures: (a) mix 1-13 (ex' 6 & 8) including Scottish mixtures lovat and bracken 1940s-mid 60s, (b) mix 1-15 (ex' 6, 8 & 13) including lovat 1980s - early 90s, (c) 12 mixtures as wrappings,1980s - early 90s, (d) lovat blue wrapping (2011)

Blending also lent itself to describe a more subtle method of working two gradations of colours either sat side by side as in Fair Isle (Fig. 3.16) or crossing each other in the warp and weft to make a third gradation as in tweed (Fig 3.17). This practice, very much within the context of Shetland, may well have originated from the dyeing of the yarns as described here and illustrated in Figure 3.18,

> 'A little natural dyeing had been done in the past, using tea leaves, onion skins, dockenroots and salt and vinegar…. Hanks of wool were boiled in a basin on top of the stove and coarse salt added to stop the colour running. It was rare for two dye batches to be the same shade and sometimes the same dye pot was used

several times to [make] paler shades useful in blending and shading patterns.' (Smith and Bunyan, 1991, p. 45)

(a)  (b) 

(c) 

Figure 3.16 examples of blending in TMA Fair Isle swatches: (a) shows the blending within the pattern, (b) and (c) show the blending in the background 1930s-60s (2011)

(a)  (b) 

(c) 

Figure 3.17 examples of blending within a warp and weft in TMA range cloths: (a) using natural shades, (b) using dyed colours, (c) using mixtures 1930s-1960s (2011)

(a)  (b) 

(c  (d) 

Figure 3.18 examples of TMA cloths testing different dyed colour gradations of: (a) blue, (b) yellow, (c) reddy/browns, (d) greens 1930s (2011)

In summary, the techniques drawn from the TMA archives were:

- common twills, herringbones and tabbys woven on four shafts,
- the structure of range cloths used in warping up and weaving,
- use of compound order of colours in light medium and dark,
- shading,
- blending.

The tool, materials and techniques across the makes 1-5

The makes were conducted through cluster 4 and 8. All documentation of the practical work came under the reflective journal and were logged either in the context or inspiration files depending on whether the activity of making was due to coding for 'A Landscape'/CAT 1, 'B1/B2 Collections/CAT 7 or 'C Archive TMA'/CAT 8. A summary of the makes is laid out in Table 3.14

Cluster 4 objective was to compare the quality of the J&S Shetland wool and its scope of shades in relation to TMA's quality and shades seen in their samples and colour cards.

This cluster resulted in three makes:

Make 1: was a series of knitted squares (5.5 x 5.5cm) using size 8 needles, and two ends of the JW working through the blending of all nine natural shades. This was achieved by blending one end of each of the nine colours with every other. Eight stitches were cast on and ten rows of plain stitch were knit (1x row garter and 1x row purl). This produced forty-five knitted squares, nine squares of the true shades (two ends of the same shade) and thirty-six squares of blended shades (Fig.3.19). It provided the potential to review the J&S Shetland shades between the squares in relation to the range cloths and blended Fair Isle patterns by TMA.

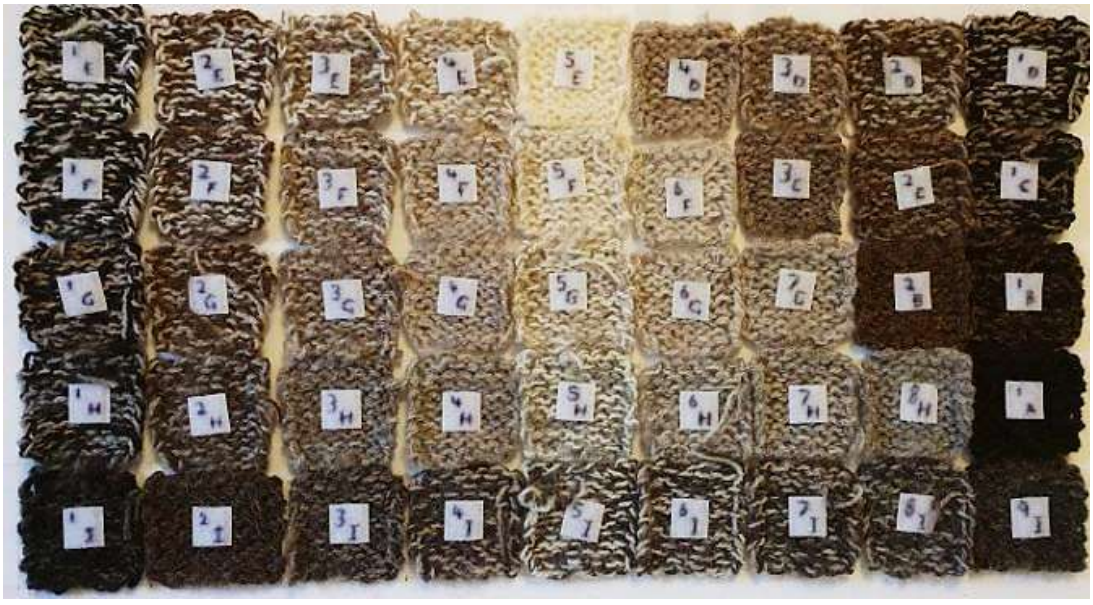


Figure 3.19 make 1: 45 knitted squares, shaded across a dark to light spectrum. Each shade is given a reference to keep track of each blend. (2017)

Make 2: was a series of six small woven samples using an AVL dobby loom with twenty-four shafts. The J&S's LW was used in Shetland black. The loom was warped up with one hundred and twenty ends to weave six 2x2 twill samples in three different ends per inch (EPI) setts. Three were in the tweed structure tabby and three were in the classic tweed twill S diagonal (Fig. 3.20). The study was testing the yarn quality in relation to TMA tweed samples and their EPI data found in the SMA/TMA business records. The results are discussed in chapter 5.2

Figure 3.20 make 2 : tabby (left), 2x2 twill (right) woven in three different setts (2017)

Make 3: was a length of cloth woven 137.5 x 5.25 inches on a tabletop Harris loom. The LW was used in the warp across the five shades using the compound order of colours: light (L), medium (M), dark (D). 157 ends were threaded up in total with 2 ends per dent, in the following order: Shetland black (D), Moorit (M), sholmit (L), white (L) and yuglet (D). This was done using a set of 30 EPI (end per inch), making the width of each shade in the cloth about an inch. A series of ten studies using the LW and the JW in the weft across all the shades, following the approach taken in make 1 to create blocks of shades as well as referencing the TMA range cloths. Figure 3.21 shows the four main sections of the woven cloth that house the ten studies. Five of the most relevant were selected for discussion in chapter 5; these are studies 2,3,4,8 and 9.

(a)  (b)  (c)  (d) 

Figure 3.21 make 3: four main sections from (a) end (d) start (2017)

Cluster 8 objective was to consider the effects of the natural shades through a herringbone and common twill across a compound order of colours working with light, medium and dark. This cluster resulted in two makes:

Make 4 was a woven sample, 4½ x13 inches using the LW. In referencing how some Fair Isle pattern are constructed with the blending of shades into and away from a central highlight colour, it looked at shading in the warp through a herringbone pattern. All five shades were used (Shetland black, moorit, yuglet, sholmit and white) in both the warp and weft. The warp repeat pattern was a 12x12 herringbone threaded up with two highlight strands central to the warp pattern every 12 threads with light to dark shading either side of it. In the weft the sample was woven in each of the five colours made up of 30 picks in the following order: Sholmit, White, Yuglet, Black, Morrit. This was done to see how each of the shades took to the shaded herringbone warp (Fig.3.22).

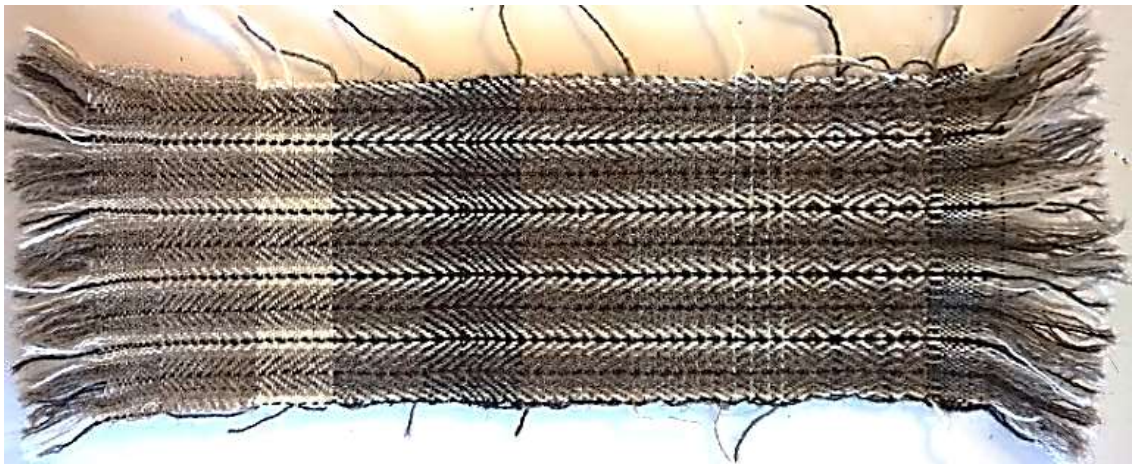


Figure 3.22 make 4: herringbone pattern (2017)

Make 5 was a length of cloth woven 39 x10 inches. It consisted of a series of studies that were built on the work produced for MK3 and MK4, looking at the construction of tweed patterns in the context of the light, medium, and dark spectrum and as perceived through the shades. The warp, in LW, was set up with four tweed patterns: three common twill checks of varying widths and a herringbone. These were woven through the yarn qualities: EW, LW and JW in all the natural shades they provided using a variety of combinations drawing on compound order of colours, shading and blending. 432 ends were threaded up in total, two ends per dent. The total warp was divided into six smaller warps. The first three warps were three variations of widths of stripes threaded as a straight draft in the S direction. The fourth warp was a point draft threaded as a reversal to give a herringbone and the final two were variations on striping through the herringbone (Fig. 3.23). This produced seventeen studies. Out of the seventeen studies, ten were selected for discussion, leaving seven which were generally found to be repeating what had been laid out in the results section 5.4.2.

(a)  (b) 

(c) 

Figure 3.23 make 5: (a) studies 1-9, (b) studies 10-13, (C) studies 14-17 (2017)

Table 3.14 Summary of tools, material and techniques used in the makes

Spread of tools, techniques and materials across the makes			
Make	Tools	Material	Technique
make 1	hand knitting: size eight needles	JW all shades	blending in the knit to make squares shading with the squares
make 2	weaving: AVL dobby/24 shafts	LW warp and weft: Shetland black	common twill x three different EPI's
make 3	weaving: Harris tabletop loom/ 4 shafts	warp: LW all shades weft: JW, EW all shades	warp set-up to weave a mini range cloth woven through all shades as in a range cloth: common twill and tabby
make 4	weaving: Harris tabletop loom/ 4 shafts	LW warp and weft: all shades	shading in the warp set-up for a herringbone pattern woven through 5 shades
make 5	weaving: Harris tabletop loom/ 4 shafts	warp: LW all shades weft: LW, JW, EW, all shades	six warp set-ups together: three common twills and three herringbones woven using light, medium and dark and shading

3.4.7 Matrix T: colour use in the TMA range cloths as documented in the range cards

Matrix T was constructed in the fourth action-led cycle: 'C Archive TMA'/CAT 11/ outcome 10 (Table 3.2). It was set up to analyse use of colour in a particular set of range cloths that had been documented on range cards. The analysis results are discussed in a separate chapter because the work was more quantitative than the exploratory inquiries and 'D Making'. This study was conducted to get closer to the intricacies in the way that colour appeared to have been used in the tweeds from the 1950s onwards. Due to its more quantitative perspective, it provides a backbone, reinforcing the more experiential approach taken in the exploratory inquiries and contributes further constructivist building blocks to add to the methods taken up in 'D Making'.

More specifically, it was an analysis of use of colour in eighty-four common twill range cloths woven between 1957 and 1967 (there is an explanation regarding the specifics in selecting this period and these tweeds in the introduction to chapter 6). The matrix provided the opportunity to see all together the colours recorded over a ten-year period. Its purpose was to get a more visually quantitative sense of decision making around colour selection and colour combinations within the tweeds to develop the range cloths.

The TMA colour palette dated from the 1940s to mid-1960s (introduced in 3.4.5, materials and techniques/ looking at shades and mixtures), aligned to this period: 1957-1967, and can be divided into these three colour groups:

- nine Shetland wool shades named: white, 1 grey, 3 grey, 3.5 grey, 4 grey, black, fawn, morrit and brown, plus the two Scottish mixtures lovat and bracken (Fig.3.24),
- eleven Shetland wool mixtures: mix 1 – mix 13 (ex' mix 6 and 8) (Fig. 3.24), and
- fifty-four dyed Shetland wool colours numbered within the scope of AV20 to AV113 (Fig.3.25).

These colours were recorded onto the range cards when developing the range cloths (Fig. 3.27) using these names and numbers attributed. The warpers and the weavers at TMA would have referred to this information to make the range cloths. It was possible to cross-reference these descriptions with the colours on the company's wool colour cards that incorporated all three groups, which incidentally would have been shown to the clients to make orders. However, because the written descriptions were not all easily visualised on the range cards, it was difficult to appreciate the decisions that had been made to test colour combinations within the traditional tweed patterns.

Therefore, the author proceeded in effect to reverse the coding by swapping the colour description for two forms of data on an excel sheet. The first data type was a binary 1 to record every time a colour was used. The second data type was changing the binary 1's to their corresponding colour in a digital format.

Figure 3.24 TMA shades and mixtures: (left) 11 descriptive names, (right) 11 numbered mixtures (2015)

(a) (b)

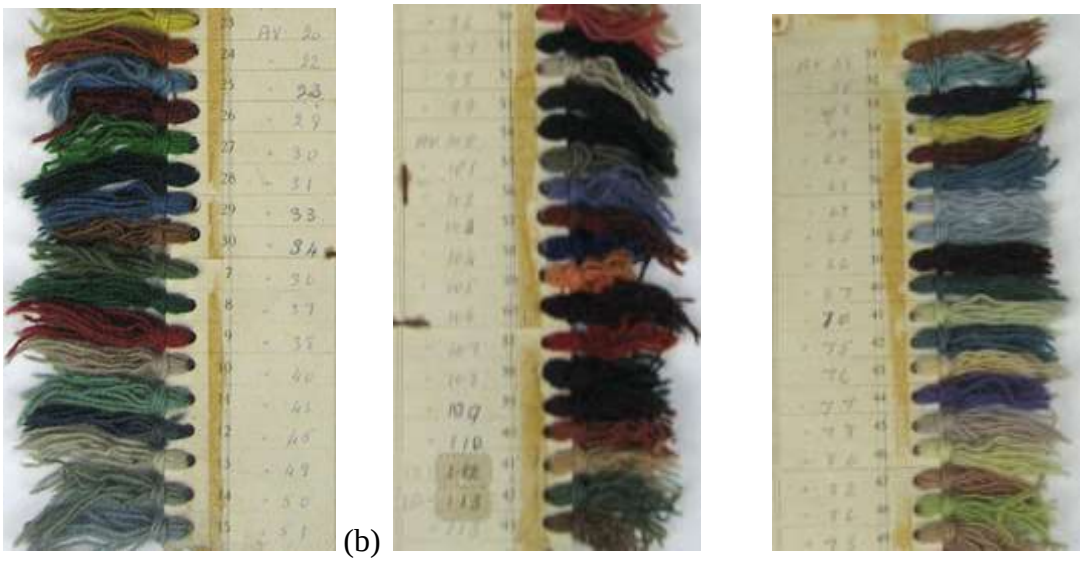


Figure 3.25 TMA, 54 dyed colours: (a) 17 colours: AV 20-51 (b) 37 colours: AV 53 - 113 (2015)

(a)

(b)

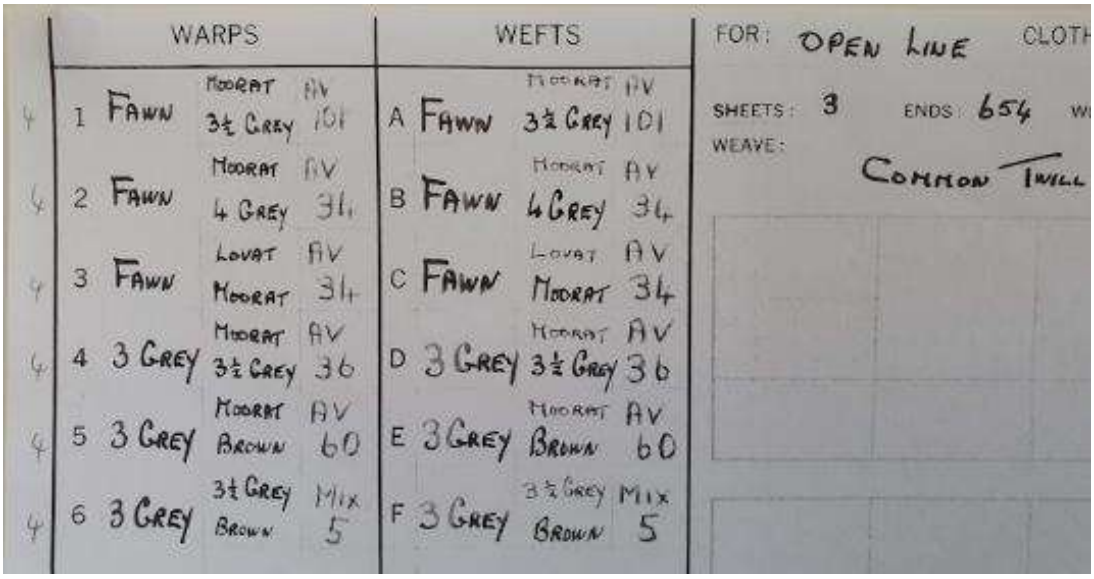


Figure 3.26 example of the three colour groups laid out on a range card: (a) a range card documenting a common twill range cloth 1950s, (b) close up of the example (top right) showing the three colour groups across a warp and weft (2015)

Matrix to present the data

The Matrix was set up on an excel sheet with all the shades and mixtures listed along the top, horizontally. Underneath each named colour was made as close a digital match to the original wool colour using the colour cards in Figures 3.24 and 3.25. Down the left side of the matrix, vertically, was listed all eighty-four range card numbers. In this way each horizontal row related to each of the range card numbers and documented all the colours catalogued on that card.

Drawing from each range card, the documentation of colour use was in two stages. The first was to mark a '1' for every shade or mixture used. Each time an AV dyed colour was noted on a range card it was listed along the top and added to the system. In this way lists of 1's could be added up horizontally giving information on shade, mixture and dyed colour use within a range and lists of 1's could be added up vertically to give information about the most used and least used shades, mixtures and dyed colours (Table 3.15).

Table 3.15 Matrix T showing the binary 1 data for 3 ranges in Shetland shades

	white	1 grey	3 grey	3.5 grey	4 grey	black	fawn	morrat	brown	lovat	bracken	tot-al
R.2334	1	1	1	1	1	1	1	1	1	1		10
R.2335	1	1	1	1			1	1	1	1		8
R.2339		1	1	1			1	1	1	1	1	8
total	2	3	3	3	1	1	3	3	3	3	1	

The second stage changed each of the 1's into their corresponding colour block. As a result, the entire excel sheet was able to give a visual sense of use of shades, mixtures and dyed colours not only across this group of common twill designs but also within each range cloth during this ten year period (Table 3.16, Table 3.17, Table 3.18). Image of complete matrix T see Appendix C, close-up 6.

Table 3.16 Matrix T showing the digital Shetland shade colour chip data for 3 ranges

	whit	1 grey	3 grey	3.5 grey	4 grey	black	fawn	morrat	brown	lovat	bracken	tot-al
R.2334												10
R.2335												8
R.2339												8
total	2	3	3	3	1	1	3	3	3	3	1	

Table 3.17 Matrix T showing the digital mixtures colour chip data for 3 ranges

	mix 1	mix 2	mix 3	mix 4	mix 5	mix 7	mix 9	mix 10	mix 11	mix 12	mix 13	tot-al
R.2334												1
R.2335												0
R.2339												5
total	1	32	0	1	1	1	0	0	0	0	0	

Table 3.18 Matrix T showing the digital dyed colour chip data for 3 ranges

	AV 99	AV 31	AV 101	AV 36	AV 82	AV 34	AV 103	AV 66	AV 100	AV 102	AV 60	
R.2334												5
R.2335												6
R.2339												0
	2	1	2	2	1	2	1	0	0	0	0	

3.5 Summary

A phenomenological underpinning to the research which guided the methodological strategy was made up of experiential methods managed through a constructivist approach to grounded theory combined with more structured and in some cases mathematical methods managed through a constructivist approach to art practice. All were supported by Schon's reflection in practice.

Thus, the author's direct experience to the research field guided by the inquires of 'A Landscape', 'B1/B2 Collections and 'C Archive TMA' were juxtaposed with the practicalities of understanding the methods adopted by TMA to weave their tweeds. The insight into the context through these approaches was generated into practical work further deepening an awareness of the design elements that might be attributed to Shetland tweed in relation to its context.

Chapter 4 - Conduct of the exploratory inquiries

4.1 Introduction

The conduct of the exploratory inquiries was inspired by a phenomenological approach through reflective material. It consisted of written, photographic, and drawn documentation organised by the author's interpretation of constructivist grounded theory coding. Such a reflexive relationship with the material provided a framework in which the experiential impact of the landscape recorded in Yell (CAT 1) could be juxtaposed against the textile narratives recorded in the museums (CAT 7) and the documentation of the TMA tweeds (CAT 8). This more focused coding process provided reference points at each stage of making a practical study (discussed in chapter 5). Therefore, this chapter lays out this framework of understanding across these three exploratory inquiry categories prior to chapter 5. It sets up a contextual relationship between the landscape and the textiles that evolved from it, suggestively pointing towards the intangible nature of TK at work.

CAT 1/Yell is explicated through the descriptor types colour, characteristics and atmosphere. CAT 7/ Collections identifies four key thematic areas: Shetland wool shades, contrasting effects, pattern through use of shades and then colour. CAT 8/TMA tweed is organised into the three elements of material, colour and pattern using the coding to show the author's developing estimation of this material. Where appropriate the author's writings in relation to the context are quoted with the reference RJ (reflective journal) and a date.

4.2 Inquiry 'A Landscape', CAT 1/Yell

The experience of being on Yell for the first time was recorded in mid-winter. This was illustrated by a visual documentation of the author's accommodation in the croft Midhouse in Cunnister and its direct surroundings (Fig. 4.1). The response to the surroundings looking out to Basta Voe (Fig.4.2), a sea inlet below the croft, was captured in a string of words to evoke the experience, *'…changing light, open landscape, remoteness, land and sea, wind, rolling clouds changing reforming…'* (RJ, 07/12/10). To counteract the vastness of the landscape the surrounding area was zoomed in on to photograph the detail (Fig. 4.3).

(a)  (b) 

Figure 4.1 Midhouse and Basta Voe: (a) the back of the croft, (b) looking from the croft across Basta Voe at a morrit and white sheep (2010)

(a)  (b)  (c)

 (d) 

Figure 4.2 Cunnister and surrounding area: (a) changing light, (b) open landscape, (c)remotness, land and sea, (d) wind, rolling clouds changing reforming (2010)

(a)  (b)  (c)  (d) 

Figure 4.3 zooming in: (a) a ruined croft, (b) grasses, (c) shadow on the snow, (d) patterning on the iced road (2010)

In stark contrast to the experience of winter in Yell were the summer months. One particular reflective journal entry, *"…storm and bad weather had cleared, and the evening was still and calm except for the birdsong…and the wind, there is always a wind…"* (RJ, 18/06/11) was significantly captured in the related photographs that expressed the glow of the northern light on that summer's evening and the warmth of colour that grew from that phenomenon (Fig.4.4). In the calm of the evening, the wind blew through the cotton grass (Fig.4.5).

(a)  (b) 

(c) 

Figure 4.4 the glow of the northern light on a summer's evening (2011)

(a)  (b)  (c)  (d) 

Figure 4.5 the wind caught blowing through the cotton grass (2011)

This pattern of response to the Yell landscape continued through the documentation and coding of CAT 7 (listed in Table 3.6) discussed here through the three descriptor types of colour, characteristics and atmosphere.

4.2.1 Colour in the landscape

It was clear, from the outset of the research, that colour was to play a crucial role in all impressions gained. There was a significant contradistinction between the seasons seen in the rusty-browns, blue-greys and whites of the wintery months interspersed by rainbows and the brilliant blues skies and seas, vibrant greens of summer turf and even purple sands on some of the beaches in the summer months (Fig. 4.6). In the winter, the northern light against constant changing weather fronts instigated the strength of colour in the landscape whereas in the summer despite the weather fronts the longer days bought the landscape alive.

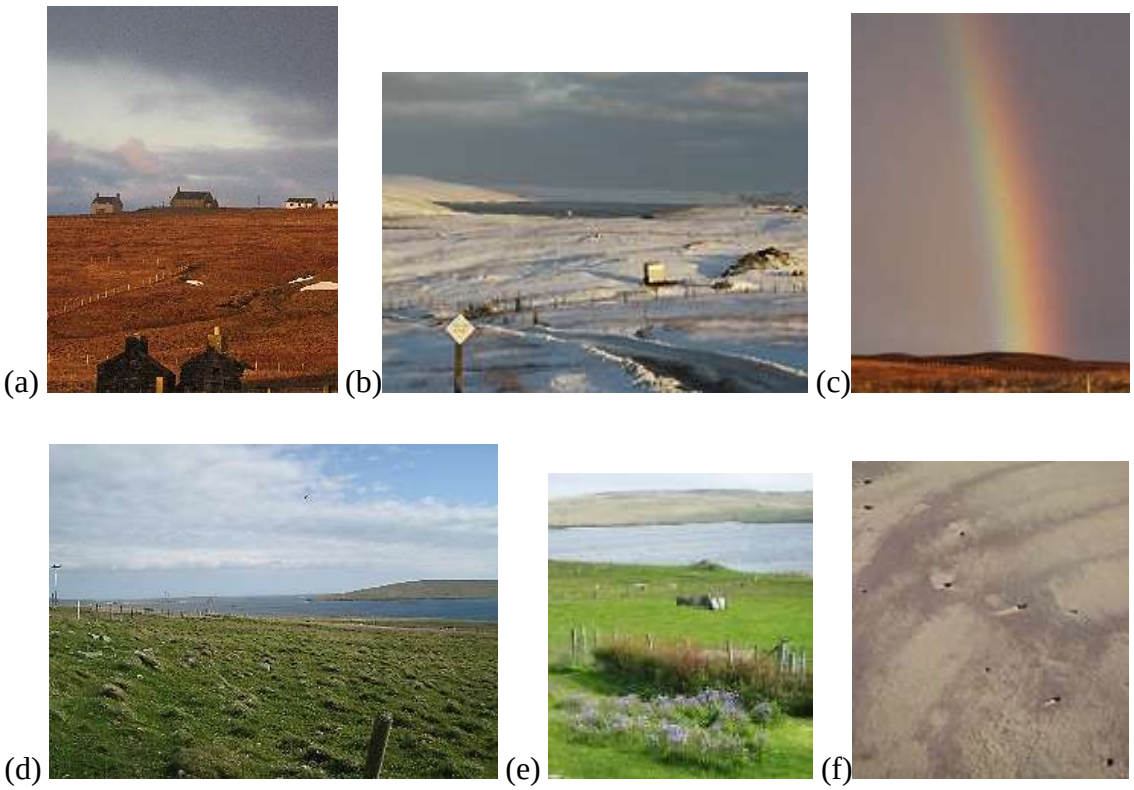
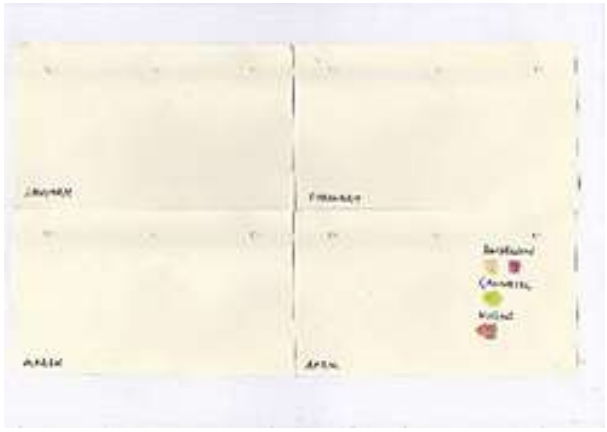


Figure 4.6 winter (2010) : (a) rusty-browns of the land, (b) bluey-greys acoss the snow, (c) a rainbow; summer (2011) :(d) blue sky and sea, (e) green fields (f) purple sands (2011/2012)

A useful, early companion was ‘The Shetland Dye Book’ (Simmons, 1985), which described the plants to be gathered, their colours to be extracted for dying, in each given month over a period of a year. The author translated Simmon’s descriptions into colour blocks to get a more visual sense of this coming and going of colour in the landscape (Fig. 4.7). This translation shows the blank canvas of Shetland’s winter months interrupted by the fluctuations of plant colour in summer.

(a)



(b)

(c)

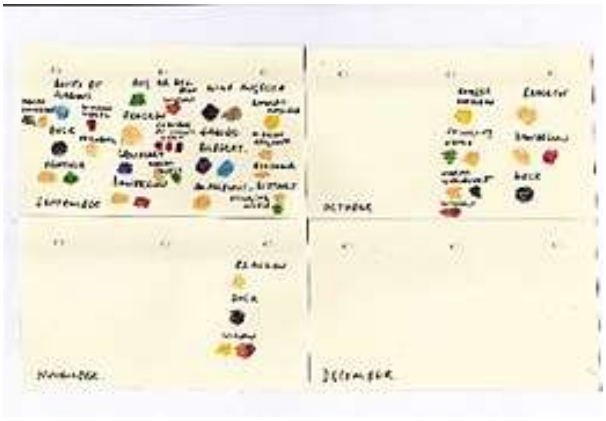


Figure 4.7 author’s translation of colours through the seasons: (a) January-April, (b) May-August, (c) September-December (2011)

This representation of colour through the year was further illustrated by recording the burst of colour witnessed in the fields descending into Basta Voe at Cunnister (Fig. 4.8).

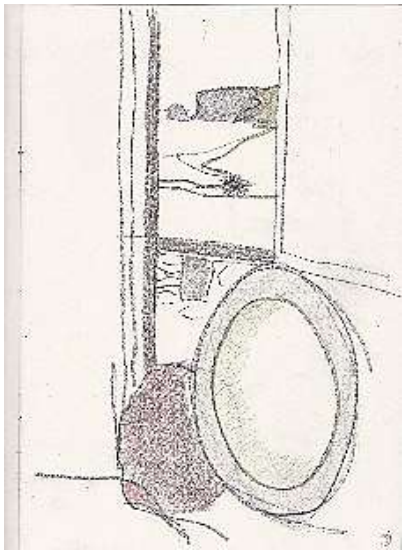
Figure 4.8 summer colours in flora and fauna: (a)-(c) bright yellows to mustards, (c-d) reds and pinky reds in the grasses, (e-g) whites against brilliant green backdrops, (h-l) pinks, purples, and blues (2011)

Experiencing these Shetland colours first-hand introduced the scope of the landscape's palette and its potential in effecting the senses intuitively and undefined. The colours were inextricably linked to the mood of the landscape as it changed through a day.

4.2.2 Characteristics within the landscape

Explorations particular to Yell moved to determining how phenomena within the landscape or beside the sea were defined. Just as colour had acted as an agent of coalescence between time and place, so weather proved a crucial defining agent for

perspective as related to objects within landscape: witness two photographs and drawings (Fig. 4.9), taken from an interior but illustrating sky/sea-scapes, ferries and cliffs between terrain. The landscape was also as much about what was not there which, in this case were trees, allowing for a sense of depth to be felt as far as the eye could see (Fig. 4.10).

(a)  (b) 

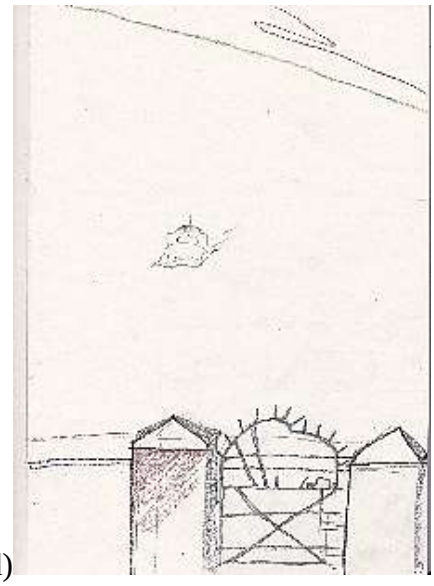
(b)  (d) 

Figure 4.9 looking out to the landscape from an interior: (a) sea-scapes, (b) cliffs on the horizon, (c) sky-scape, (d) a ferry crossing (2011)

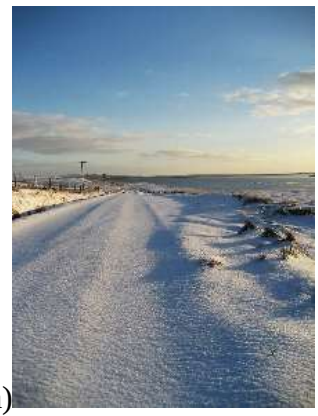
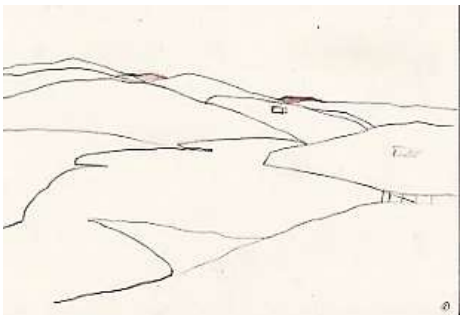
(a)  (b) 

Figure 4.10 looking out to the north sea from Cunnister: (a) in winter (2010), (b) in summer (2011)

'Depth', in retrospect 'perspective', abstract in describing a fundamental sense of this open landscape, engendered further drawings (Fig. 4.11), where perspective did indeed outline different shapes, whether animal, vegetable, mineral or man-made, as the eye travelled to the horizon. These shapes are drawn as simple linear forms, connected as a puzzle, the linear route through the landscape highlighted from the furthest to the nearest points to accentuate the impression of perspective. Similar relational descriptors were attributed to a costal walk out to the Stuis of Graveland (Fig. 4.12)

(a)  (b) 

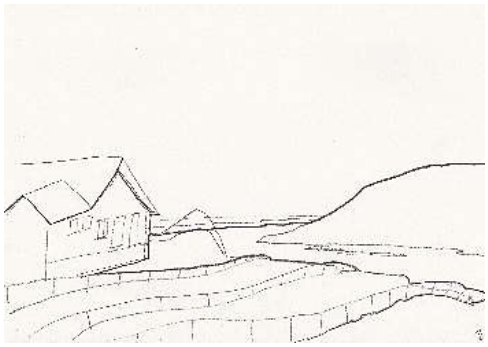
(c) 

Figure 4.11 drawing the open landscape: (a) depth and horizon, (b) depth and linear forms, (c) depth and linear routes (2011)

(a)  (b)  (c) 

Figure 4.12 photographing the open landscape: (a) depth and horizon, (b) depth and linear forms, (c) depths and linear routes (2011)

Where sky/sea-scapes and long distance views remained the backdrop to the Yell landscape, within it emerged characteristics of deterioration found in farm machinery and old crofts discarded and left behind (Fig. 4.13).

(a)  (b) 

(c) 

(d)  (e) 

Figure 4.13 discarded and deteriorating: (a-b) farm machinery, (c-e) abandoned crofts (2011)

However, such descriptors as ‘discarded and deteriorating’ also related to more natural occurrences that were noticeable in the summer months, such as the detritus from birds feeding on the shellfish then regurgitating broken-up seashells, crab carcases and legs (Fig 4.14).

(a)  (b)  (c) 

(d)  (e) 

Figure 4.14 naturally discarded (2011)

Abstract pattern was found in marbled effects within nature to contrasting and bright in richly coloured moss or subtly nuanced across a gradation of colour on beaches and across rock faces (Fig. 4.15).

(a)  (b)  (c)  (d) 

Figure 4.15 marbled effects: (a-b) contrasting and bright in moss; subtly nuanced (c)across beaches, (d) a rock face (2011)

The lens of focus that scanned Yell in this section has painted a picture of a sense of beauty hidden in the remoteness of its landscape combined with a stark reminder of nature's presence entwined with the vulnerability of a crofting life, ever changing ever evolving. The sifting of the visual material through the factors and descriptors drew out different combinations exemplifying the fabric of the landscape (Fig.4.16) in the treeless views, changing light, rolling clouds, degrading crofts, wondering sheep, rusting farm machinery.

(a)  (b)  (c) 

(d)  (e)  (f) 

Figure 4.16 a sense of beauty hidden in the remoteness of its landscape: (a-b) treeless views, (c-d) changing light, rolling clouds, (e) degrading crofts, (f) wondering sheep, (g-h), rusting farm machinery (2010/2011)

4.2.3 Changing atmosphere across the landscape

The weather and the fluctuating light also contributed to experiencing the changing atmosphere of the landscape. One particular thread of coding identified with the effects of the northern light by looking at such combinations as ‘sunlit + silhouetted’ and ‘contrast/contrasting’. The descriptors ‘sunlit’ (Fig.17) and ‘silhouetted’ (4.18) were expressing the different ways the crofts were illuminated in their setting. The code contrastive was used to describe the way the light could deepen or brighten the colours in opposition to each other. Contrastive started to work effectively with the descriptor vibrant to reiterate the strength of colour in certain images. (Fig 4.19). These two codes together were connected to a third dependant on the atmosphere. Figure 4.20 illustrates these combinations using the same series of images in Figure 4.19 but this time showing the third variable to differentiate each of these images from each other: (a) vibrant + contrastive + sunbeam; (b) vibrant + contrastive + sunlit; (c) vibrant + contrastive + stillness; (d) vibrant + contrastive + bright. This degree of detail in the coding process not only focused the manner in which the visual material was read but it also filtered the visual material by impressions and observations captured in these experiential moments in time.

(a)  (b)  (c) 

Figure 4.17 sunlit derelict crofts (2010/2011)

a)  (b)  (c)  (d) 

Figure 4.18 silhouetted crofts in a treeless landscape (2011)

(a)  (b)  (c)  (d) 

Figure 4.19 contrastive light effects and vibrant colour (2011)

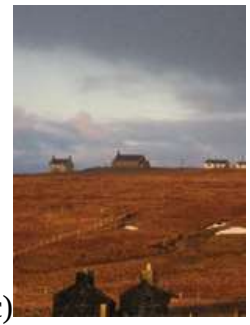
(a)  (b)  (c)  (d) 

Figure 4.20 code connecting with vibrant + contrastive: (a) + sunbeam, (b) + sunlit, (c) + stillness, (d) + bright (2011)

4.3 Inquiry 'B1/B2 Collections'/CAT 7: collections

The author's response to the museum collections focused on recording and interpreting the Shetland textile displays, concentrating on use of pattern, rhythm, colour and material. Parallels were made with photographs and drawings of the author's own collections of wool, stones and shells brought in from the landscape. These parallels covered:

- the variety of shades of the Shetland wool,
- dark to light shading and contrasting effects,
- Shetland wool shades seen through pattern,
- dyed wool colours seen through pattern.

The following section looks at these parallels and the factors and descriptors that developed (listed in Table 3.7) contributing to CAT 7.

4.3.1 The variety of shades of the Shetland wool

Early in the research the variety of the Shetland shades were described in a written response as '*creams-beiges-browns-greys'* (RJ 16/02/11). These words together became a very useful descriptor to depict the spectrum of wool shades in work, characterising further documented material. Initial examples were found in local sheep, a mother and her lamb in the fields beside the author's accommodation at Midhouse, showing a strong contrast between the grey-brown of the mother's fleece and the whiteness in the wool of her lamb (Fig. 4.21). These sheep were not being reared for the wool, so these images show how the fleece was dripping wool off the sheep's back. The wool therefore became scattered across the fields and caught against the barbed wire. The scattered wool collected from these fields emphasised, in their raw form the descriptor 'creams-beiges-browns-greys', a light to dark spectrum illustrated more intrinsically in a large circle as rowers ready to be spun into yarn (Fig. 4.22). These shades were subsequently echoed in displays of a pile of weathered rope, old boat panels, (Fig. 4.23) and a collection of speckled birds' eggs (Fig. 4.24).

(a)  (b)  (c) 

Figure 4.21 initial examples relating to descriptor 'creams-beiges-browns-greys': (a-b) lambing season in the fields next to Midhouse, (c) wool caught against the barbed wire (2011)

(a)  (b) 

Figure 4.22 examples of Shetland wool shades: (a) collected from the fields by Midhouse, (b) a wheel of rowers (2011)

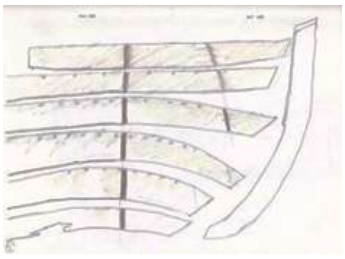
(a)  (b)  (c) 

Figure 4.23 further examples relating to descriptor ‘creams-beiges-browns-greys’: (a) a pile of weathered rope, (b-c) old boat panels (2011)

(a)  (b)  (c) 

Figure 4.24 bird eggshells with ‘creams-beiges-browns-greys’ speckles (2011)

A more focused study of this descriptor ‘creams-beiges-browns-grey’ was made through the author’s collection of seashells and beach stones. The photographic study that proceeded documented these collections in their separate sub-categories, in accordance to their size (large to small), shade (dark to light) and shape (similarity or difference). A display of seashells was referenced highlighting these three elements (Fig. 4.25).

(a)  (b)  (c) 

Figure 4.25 seashells arranged in size-shade-shape (2011)

The author’s first arrangements took on a grid like effect that helped manage the size-shade-shape format. (Fig. 4.26).

(a)  (b)  (c) 

Figure 4.26 size, shade, shape: (a) seashells, (b-c) beach stones (2011)

Working from the creams-beiges-browns-greys descriptor a following further eleven variations developed (Fig. 4.27):

(a) creams-beiges-browns-greys

(b) creams-beiges-browns

(c) cream-beige-grey

(d) creams- beiges

(e) creams-browns

(f) creams-greys

(g) creams

(h) beiges-browns-greys

(i) beiges-browns

(j) browns-greys

(k) browns

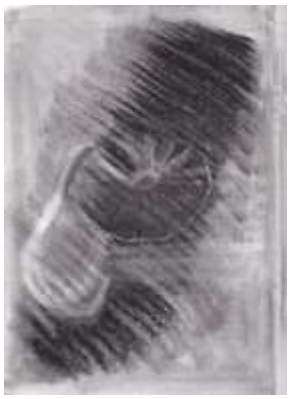
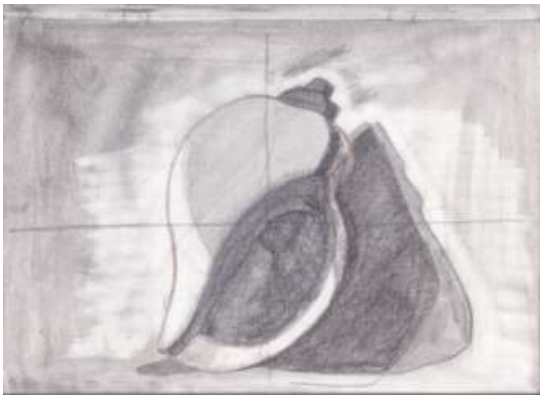
(l) greys

Figure 4.27 size-shade-shape/ creams-beiges-browns-greys descriptors (a-l) (2011)

These assessments of shading became a useful reference tool with regard to the spectrum of wool shades through making. It also underpinned the prevalence of nature's natural palette scattered through the landscape and at the mercy of and defined by the elements.

4.3.2 Dark to light shading and contrasting effects

Using the sea shells, a study was made to look at the descriptor dark to light as another way of perceiving the spectrum of shades. This descriptor was explored using charcoal and soft pencil to depict the shadows cast around individual seashell shapes using smudging and rubbing out techniques. These techniques worked layer upon layer, created the strong contrastive effects of dark to light. It also drew on a sense of depth and 3-dimentiality with the background of the subject matter (Fig. 4.28). In response to these drawings, a series of photographs documented the placement of four of the beach stones on top of and against each other to explore the effects of dark to light through the stones' shades from dark to mid to light grey (Fig. 4.29).

(a)  (b) 

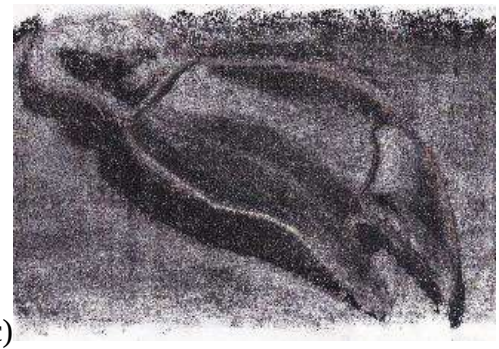
(c) 

Figure 4.28 smudging and rubbing out to create contrastive effects (a-c) (2011)

(a)  (b)  (c)  (d) 

Figure 4.29 the effects of dark to light through the stones shades (a-d) (2011)

Groupings of seashells were subsequently arranged to look at size and shape in relation to further contrastive effects of shadows cast across a dark to light spectrum evoking again the sense of 3-dimentiality between the object, its shadows and the patterns that were formed. (Fig.4.30). This was reiterated in a photograph taken of a group of stones that together covered a more nuanced shading of grey from dark to light (Fig 4.31).

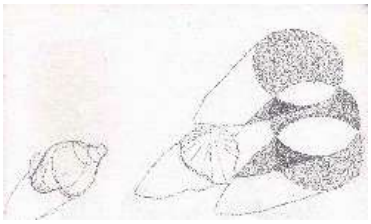
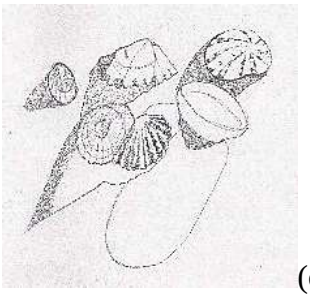
(a)  (b)  (c) 

Figure 4.30 contrastive effects of shadows evoking 3-dimentiality (a-c) (2011)

Figure 4.31 shading of grey from dark to light using stones (2011)

Consideration of the dark to light spectrum in this way evoked the descriptors' linear routes and linear forms explored in drawing the landscape in Yell. Further placements of the stones and drawings were made to explore these connections. The first study grouped the stones using the size-shade-shape descriptor in such a way that a linear

route could be traced across a shaded grey spectrum (Fig. 4.32). In the depiction of this placement, varying strengths of line outlined the furthest to the nearest points in the arrangements.

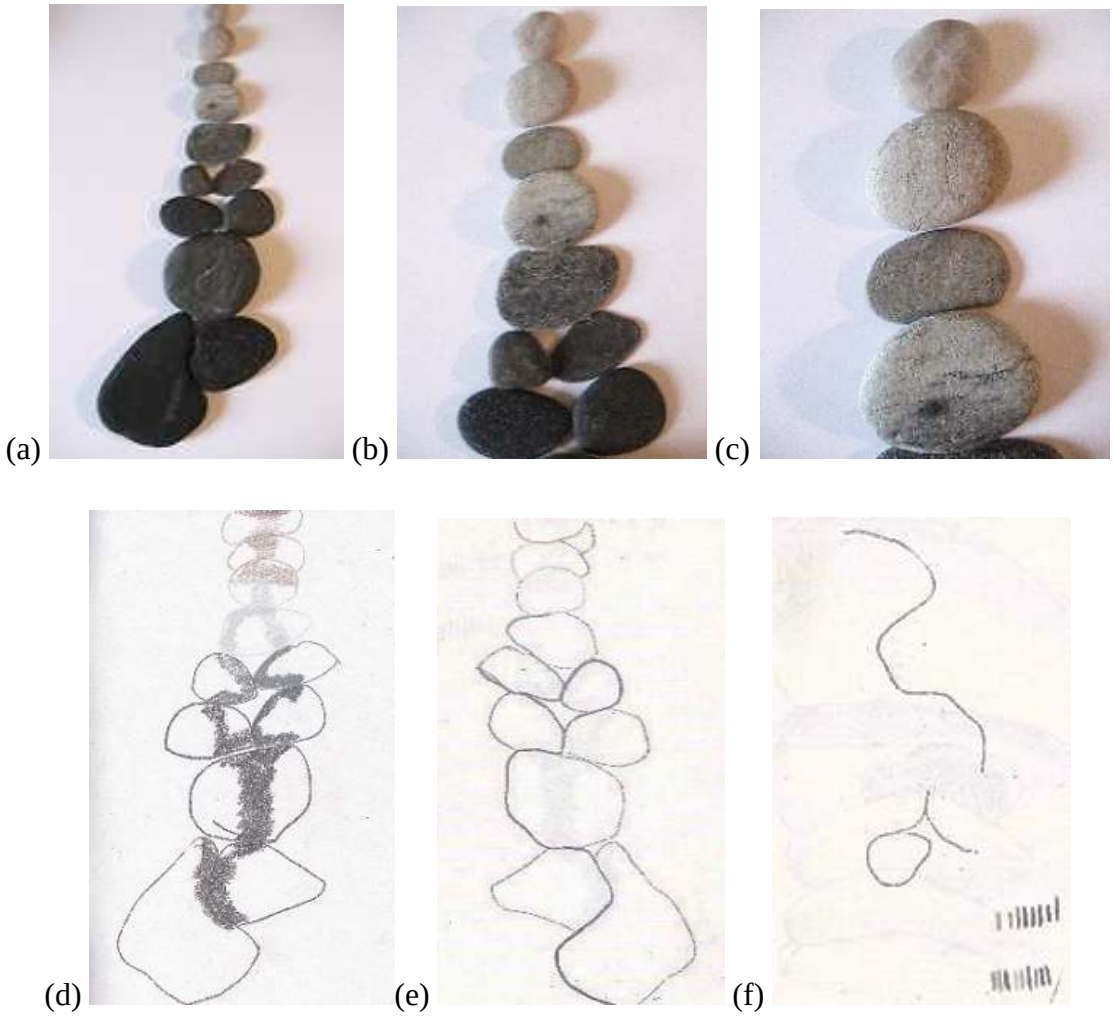


Figure 4.32 linear routes, examples read vertically across the images: (d) is in response to (a), (e) is in response to (b) and (f) is in response to (c) (2011)

The second study first stacked up a group of stones and then simply laid them alongside each other to consider each time linear forms (Fig 4.33). These arrangements of the stones lent themselves to mimicking the landscape with its contours highlighting each of the stones' forms in relation to each other. Both these placements made a connection again with 3-dimentiality and depth.

Other linear forms were traced within the landscape creating their own dark to light, contrasting or shading effects. Wool blew in the wind in matted clumps, entwined

against the barbed wire fences that divided the sheep (Fig. 4.34). One particularity was the way the wool had become so entangled, creating sculptural forms (Fig. 4.35).

The idea of entwined wool introduced the related descriptors interlacing and intertwine to describing displays of fishing ropes and fishing weights which reiterated the sense of layering and linear routes also found in the clustered and intermingled ropes of varying widths (Fig. 4.36).

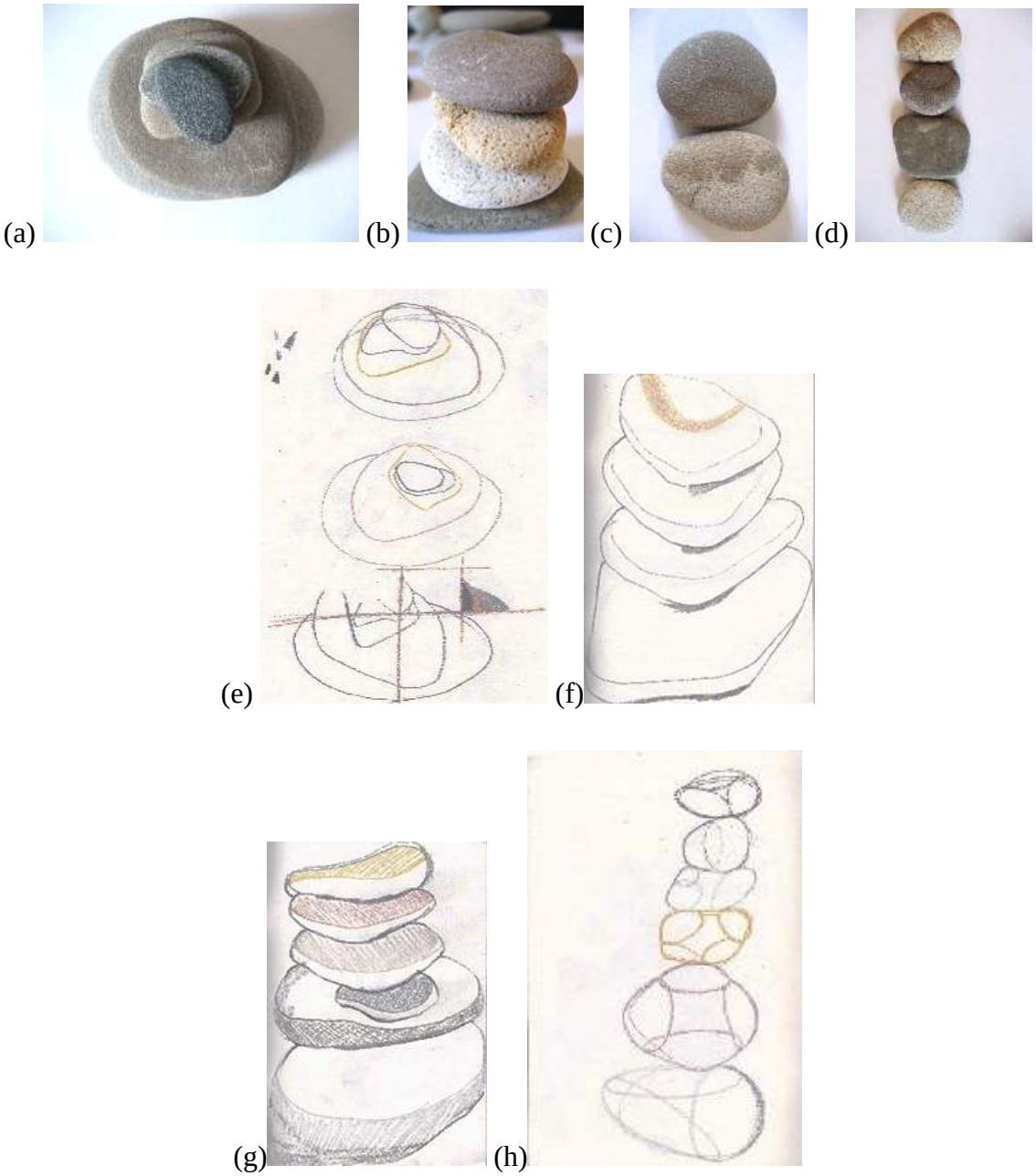


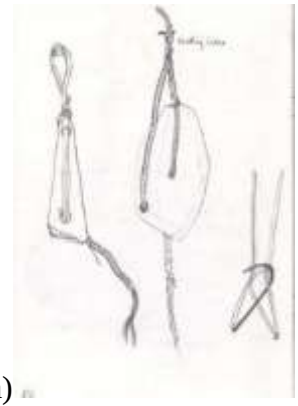
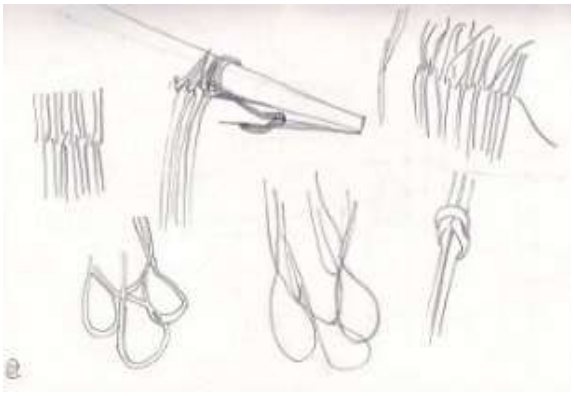
Figure 4.33 linear forms, examples read vertically across the images: (e) is in response to (a), (f) and (g) are in response to (b) and (h) is in response to (c) and (d)

(a)  (b)  (c) 

Figure 4.34 matted clumps of wool blown in the wind

(a)  (b)  (c)  (d) 

Figure 4.35 entwined wool in sculptural forms

(a)  (b) 

(c)  (d)  (e) 

Figure 4.36 interlacing, intertwine layering, linear routes: (a) fishing weights, (b-e) old fishing ropes (2011)

In response to descriptors interlace, intertwine, entwine and linear routes the author played with the placement of cone shaped seashells of varying sizes. These were organised with the effect of interlacing, placing outside surfaces down, against each other, with the rounded edges overlapping one another. Shadows were cast around this set-up making linear dark and light patterns.

The photographs were a good record of the placement of these shells (Fig.4.37). However, the drawings allowed for a scanning of the detail to hone in on the linear routes through the set-up between the shadows and the shells (Fig.4.38).

In a similar way to how the landscape and beach stones had been drawn the shapes in this layout were highlighted as they appeared interlacing each other from the furthest to the nearest point, using varying strengths of the line to explore the dark to light shades.

(a)  (b)  (c) 

Figure 4.37 cone shaped seashells overlapping with the effect of interlacing (2011)

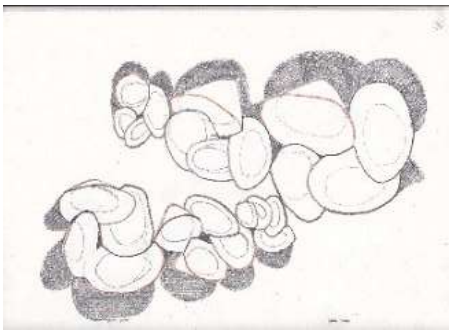
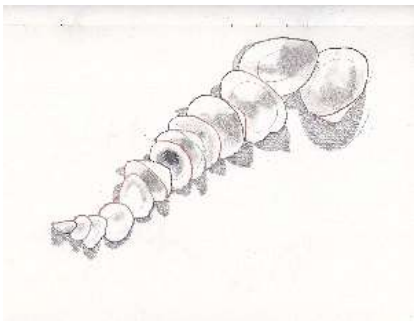
(a)  (b) 

Figure 4.38 exploring linear patterns and dark to light patterns (2011)

Responding initially to the descriptors dark to light through photography and drawing set in motion a process of exploration that identified parallels across the material with

recurring codes while developing new descriptors within the context. This immersive process allowed ideas to be continually revisited in different ways and connections to be made to develop experiential understanding.

4.3.3 Shetland wool shades through pattern

Across the textiles displays at SMA, UHC and TM were examples of the use of natural wool shades worked in the knitted and woven textiles. Illustrated here are five different examples of these. The first shows the lace shawls and cardigans in the Shetland white, the softest shade in the fleece (Fig. 4.39). The second is of hap shawls with the scallop edges knit across the shades and plain knitted items in single shades (Fig 4.40).

(a)

(b)

(c)

Figure 4.39 examples of Shetland white: (a) fleece, (b) spun wool, (c) Unst lace pattern on a shawl, early 1930s (2011)

(a)

(b)

(c)

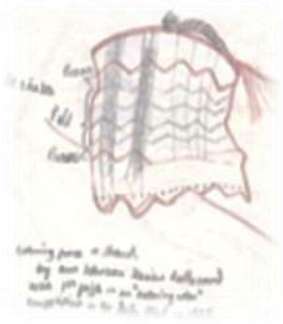
Figure 4.40 Shetland wool shades in a hap shawl and plain knitted items: (a) shaded hap shawls and cardigan1930s, (b) colour matching in sketchbook, (c) drawings of plain knit undergarments on display1920s and 30s (2011)

A third example was the striping of four shades, creating a contrast across the brown to greys. This contrasting effect was used on a pair of fingerless evening gloves. (Fig. 4.41)

(a)  (b) 

Figure 4.41 contrasting with browns to greys on a pair of fingerless gloves, early 1900s (2011)

The fourth example was more specific in showing five shades being knitted across the beige-brown spectrum. This shading effect, more commonly seen in Fair Isle, was used in a matching lace shawl and purse and on a woven scarf (Fig. 4.42).

(a)  (b) 

(c)  (d) 

Figure 4.42 shading with browns-beiges: (a-c) a purse and shawl 1935, (d) a scarf 1980s (2011)

The final example was the use of the natural shades in the Fair Isle patterns and tweed where the patterning was busier and denser inviting a much more playful approach to how the shades worked in both shaded and contrast effects. The Fair Isle was drawn in a minimal way recording just the use of shades (Fig. 4.43). In the tweed the use of the shades, taken from a page in a TMA range book (an example of the sampling process of trailing a single tweed pattern across all possible shade variations) was documented by recording the predominant shade of each swatch (Fig 4.44).

(a)  (b) 

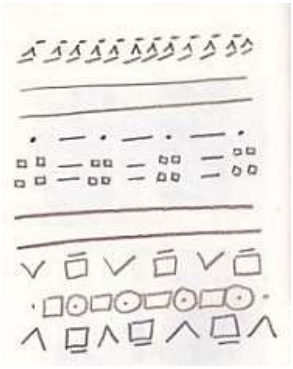
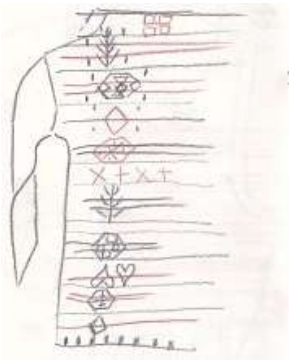
(c)  (d) 

Figure 4.43 Shetland shades in Fair Isle: (a-b) scarf and gloves 1960s, (c-d) depiction of shades used in Fair Isle 1920s (2011)

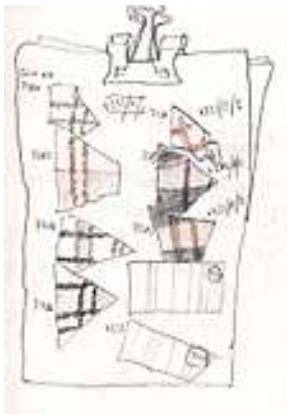
(a)  (b) 

Figure 4.44 Shetland shades combinations used in TMA tweed: (a) for a customer order, (b) in a tweed range book 1930s (2011)

The museum displays underpinned the reliance on the Shetland shades within the Shetland textiles. In recording these details, a sensitivity to the different tones of shades across the spectrum started to emerge.

4.3.4 Colour through pattern

A particular RJ entry, described the process that had developed documenting the Fair Isle, '*I started with knits and by the end of the day I was looking at pattern and colour – breaking down the layers of pattern* (RJ 07/02/11). It continued with the observation that, *'There is an odd mixing of colour. One 1920s jumper in particular,* (Fig. 4.45), *colours pale brown- shades 3, plus a blue, pale cloudy blue*,' (RJ, 07/02/11). The author used the word, odd, to highlight a combination of colours, which were unfamiliar to her eye; that being one dyed colour amongst three natural shades. This mix, a characteristic of colour use in Shetland in the 1920s, set the tone for what to expect, especially in the tweeds studied for CAT 8 (discussed in section 4.3).

(a)  (b) 

Figure 4.45 Recording three shades of pale brown with a pale cloudy blue: (a) the Fair Isle jumper 1920s, (b) the documentation of colour use (2011)

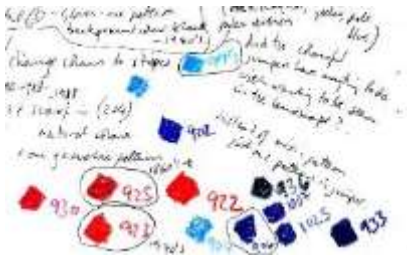
(a)  (b)  (c) 

Figure 4.46 colour matching in the groups of colours used in the Fair Isles: (a) reds and blues, (b) yellows and mustards with greys, (c) sand, orange turquoise, blue, pink combinations (2011)

Colour matching combinations were initially noted down in the groups that they were seen within the Fair Isle pieces. There were strong reds and blues, yellows, mustards with greys and sand, orange, turquoise, blue, pink combinations (Fig. 4.46).

The Fair Isle patterns on display were motif stripe patterns and all-over patterns. An example of the motif stripe patterns was documented from a 1920s photograph of a model in a Fair Isle V-neck jumper (Fig. 4.47).

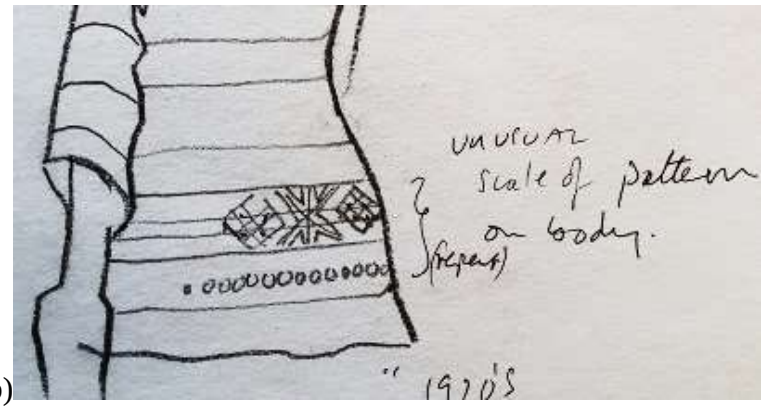
(a)  (b) 

Figure 4.47 study of a motif strip Fair Isle pattern: (a) photograph of 1920s motif stripe example (b) breaking the pattern down into 4 layers (2011)

The pattern was broken down into four layers. These four layers were identified as:

- contrasting colour stripes in threes,
- alternate zeros' and crosses' shapes,
- a dark background to the motifs,
- the striping for three sets of threes as: pale-light-pale with every fourth set of threes: light- pale-light.

This single change in the striping rhythm with its working with the dark background meant that the zeros' and crosses' motif was interpreted in three different ways allowing the pattern to recede and emerge through the knitting (Fig 4.48).

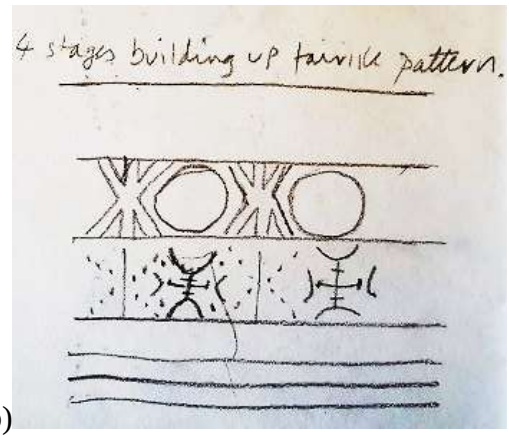
(a)  (b) 

Figure 4.48 close-up of 1920s motif stripe Fair Isle pattern: (a) zeros and crosses, (b) interpreted in three ways between stripes (2011)

An example of an all-over pattern was found in a scarf. This pattern was made up of six different diamond patterns. When each of the different diamond patterns was numbered, a rhythmic pattern of numbers started to develop, and this complete rhythmic pattern made its own diamond shape. This illustrated the complexity of each horizontally knitted row and its role as a building block, colour coordinated to interpret each motif in relation to the ones around it. Again, the motifs emerged and receded through the knit across a spectrum of dark to light colours (Fig 4.49).

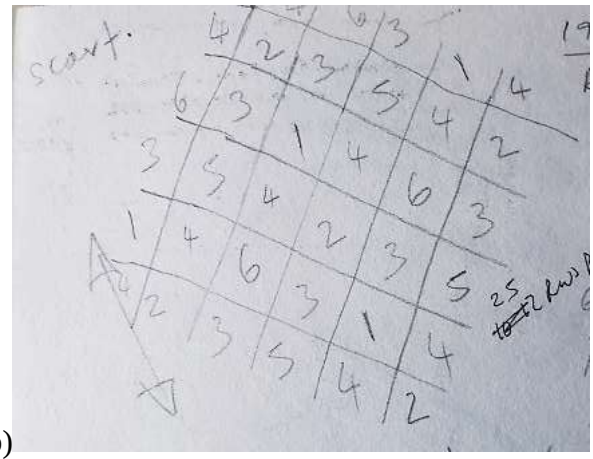
(a)  (b) 

Figure 4.49 Fair Isle scarf as a rhythmic pattern of numbers: (a) each horizontal row, colour coordinated as a building block, (b) author's study of the pattern in 6s diamonds, making a larger diamond shape across and up the scarf (2011)

Other examples of all-over patterns made with this degree of complexity showed how this row-by-row building block approach also created the effect of a chequerboard and vertical striping due to the geometric nature of this kind of pattern construction (Fig. 4.50).

(a) 

(b) 

Figure 4.50 examples of all-over Fair Isles patterns: (a) chequerboard effect, (b) vertical striping effect 1920s – 1950s (2011)

These Fair Isle examples of striped motifs and all-over patterns had the illusionary sense of depth and contrast. The patterns were layered by the way the colour had been used. These effects were explored in further placements of the seashells and beach stones.

The seashells were scattered against each other in no particular order to be photographed. The different shades of the shells across the grey spectrum and into the browns recreated that sense of depth and contrast (Fig. 4.51). The related drawings depicted the spaces between the shells, defining their shapes within the grey to brown spectrum (Fig. 4.52) This repeated the idea of forms within a dark to light background.

(a)  (b) 

Figure 4.51 seashells scattered (a-b) (2011)

(a)  (b) 

Figure 4.52 depth and contrast explored through the spaces between the shells (a-b) (2011)

Amongst the beach stones, the more speckled and patterned types were selected to be photographed and colour matched (Fig. 4.53) referencing the descriptors shaded, contrasting, dark to light and layering. Layering was considered here in the sense that a speckle or a stripe was on top of the stones surface colour.

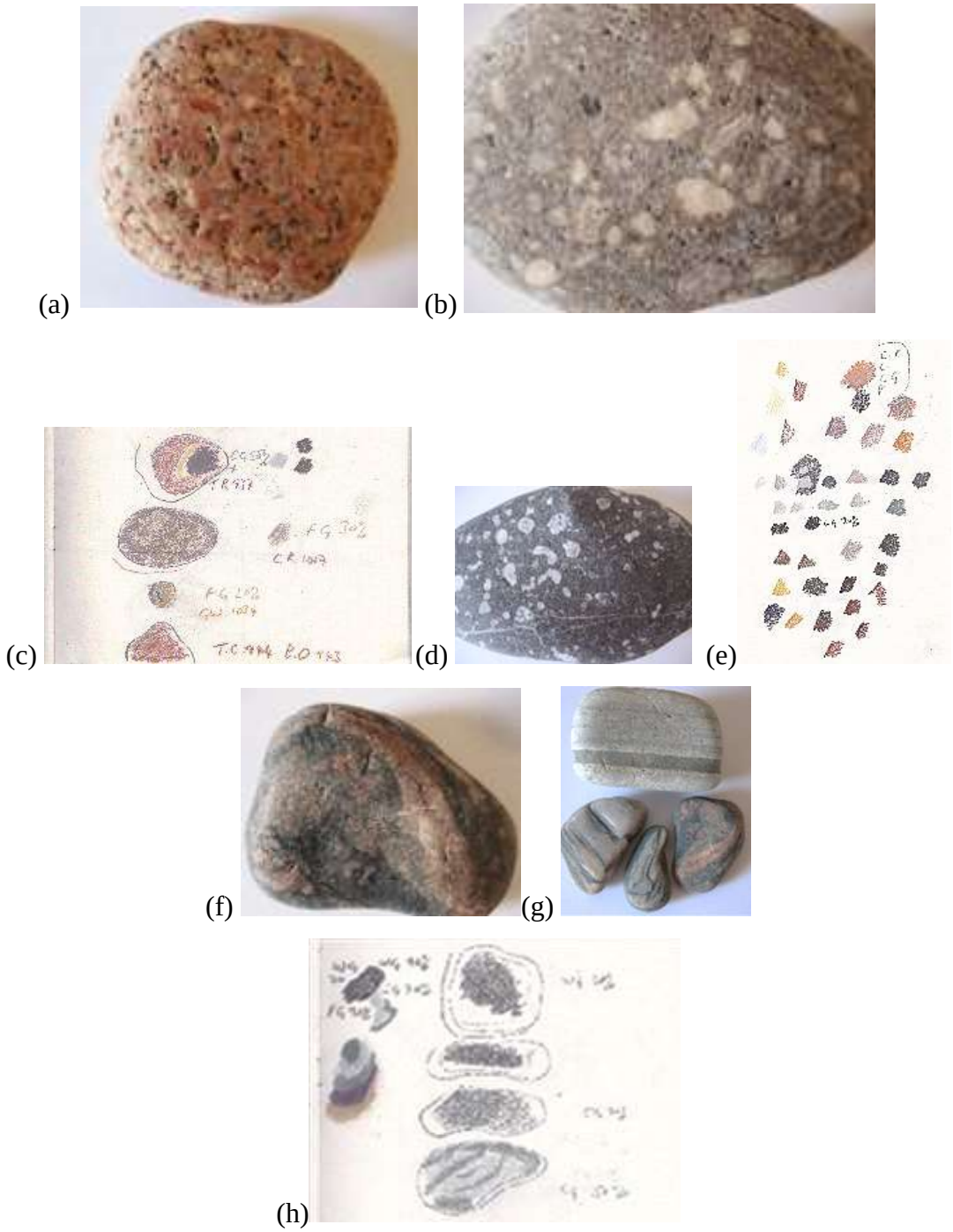


Figure 4.53 exploring patterns layered by colour: (a)-(c) shaded and layering, (d) contrasting and layering, (e) colour matching (f)-(h) dark to light, layering, contrasting and colour matching (2011)

Fig 4.54 shows a placement of four shells concentrating on their patterned surfaces and the contrasting light and dark areas found across these shapes. The beach stones were then laid out in two clusters, photographed, and then drawn (Fig. 4.55). The first drawing was looking at the patterns within the stones and in contrast to each other. The second drawing was identifying more with a dark to light shades across the stones in contrast to each other.

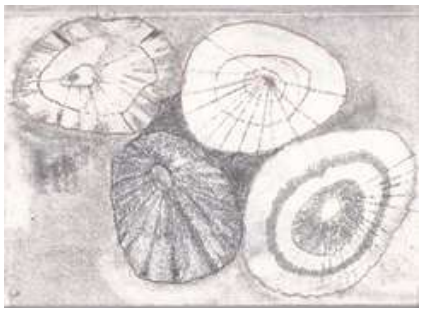
(a)  (b)  (c) 

Figure 4.54 patterned surfaces contrasting light and dark areas (2011)

(a)  (b) 

(c)  (d) 

Figure 4.55 exploring groups of patterns and colour: (a) – (b) patterns in contrast to each other, (c) dark to light shades in contrast to each other (2011)

Looking at these patterns in terms of the recurring descriptors provided a way of understanding the complexity in the pattern construction from a position of perception. The photographic and drawn studies explored these perceptions again in relation to more natural objects to continue to find connections with the context.

4.4 Inquiry ‘C Archives TMA/CAT 8: TMA tweed sampling

The author’s impression of the Fair Isle patterns which she described as being layered up through use of colour evoking depth, instigated the way the author considered the aesthetic structure of the TMA tweed for CAT 8 and the complexity of pattern constructions that might come from that.

The TMA range books (fifteen in total spanning a period of about sixty years from the late 1900s into the 1970s, cross referenced where possible with the range cards) were studied as a group to build a sense of the TMA tweeds and their evolving nature over this period of time. Design element started to change around the 1900s as common twill and herringbone patterns were repeated through a variety of Shetland shade combinations. The tweed in this early period was mid-weight with the occasional progressive swatch – dyed colours were limited and crude otherwise the natural palette worked well (Fig. 4.56). There was a sense of change in the design and quality around 1938 where some of the colour combinations within the tweed patterns started to be more subtle (Fig. 4.57). By 1949 there was a sense that the customers were working with TMA directly because specific orders were characteristically different from each other (Fig. 4.58). The main palette continued to be dominated by the natural colours of the Shetland sheep (Fig.4.59).

(a)  (b)  (c) 

Figure 4.56 tweeds (a-c) 1900s (2011)

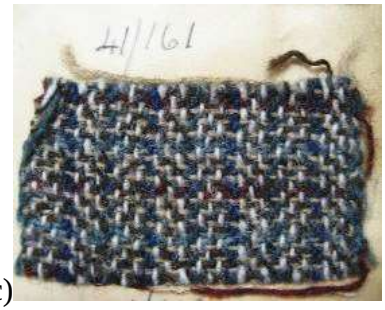
(a)  (b)  (c) 

Figure 4.57 tweeds (a-b) late 1930s to (c) early 1940s (2011)

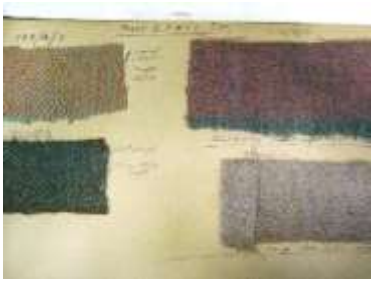
(a)  (b)  (c) 

Figure 4.58 specific client tweed orders 1960s: (a) Paul Stuart, N.Y., (b) Mary Lewis Inc, (c) Julius Bernth, Denmark (2011)

(a)  (b) 

Figure 4.59 Shetland wool shades within the tweeds 1950s (2011)

This visual documentation bought to the fore three key elements:

- material quality (using the Shetland wool),
- use of colour in the tweed
- design effect of the tweed patterns.

These elements were broken down into factors and descriptors through the photographs and in reference to reflective journal writing. Correlations were made across these codes to build a sense of the design context of these specific tweeds.

4.4.1 Material quality

Prior to working through the range books, the author's first impression of the material quality was in its raw form, on the Shetland sheep or as a fleece. It was during those first few days when the author was 'inside looking out' at the winter storm as it consumed the landscape that she recounted how the sheep would battle their way through the snow and rain as they walked in single file down towards the sea in search for food. This was a stark reminder of how hardy the sheep had to be in the Shetland landscape and how susceptible the fleeces were to such conditions (Fig. 4.60).

(a)  (b) 

Figure 4.60 a flock of sheep battling a storm (2010)

After this storm, the author was involved in helping release a sheep with a morrit fleece from being entangled in a barbed wire fence. Being close up to the sheep the author was struck by how the fleece was so dense, soft, frizzy and bouncy.

Figure 4.61 after the storm, a morrit sheep grazing. (2010)

Subsequently, a visit to meet Oliver Henry at J&S contributed to a growing appreciation for the wool's unique tactility. Henry explained how soft Shetland wool could be and showed the difference between a pure Shetland fleece and a mixed breed one. The most interesting product J&S had developed at this time was Shetland wool carpets in the different brown shades. Experiencing the dense bounce of the carpet in the showroom was reminiscent of how the sheep's fleece felt when setting it free from the barbed wire.

Experiencing first hand these spongy and light qualities in the fleece helped to initially explain the prevalence of lightweight tweeds that were then seen in the SM store. It was not so much a surprise that the Shetland tweed was intrinsically lighter than other tweeds but that this aspect played such a significant part in a collection of cloth qualities.

Working through the range books brought to light nine qualities labelled in accordance to the differentiation in the weight of the cloth. These labels were handwoven (fig.4.62), handspun (Fig.4.63), heavy/coat weight (Fig.4.64), standard (Fig.4.65), lightweight and special lightweight (Fig.4.66), featherweight (Fig.4.67), petalweight, zephyr and tie weight (fig.4.68).

(a)  (b) 

Figure 4.62 examples of handwoven tweed from the 1900s (2011)

(a) 

(b) 

Figure 4.63 examples of handspun from the 1930s (2011)

(a) 
(b) 
(c) 

Figure 4.64 examples of (a) overcoating 1920s, (b) heavyweight 1930s, (c) coatweight 1940s-50s (2011)

Figure 4.65 example of standard 1950s-60s (2011)

(a) 

(b) 

Figure 4.66 examples of (a) lightweight 1949 (b) special lightweight 1950s-60s (2011)

(a)  (b) 

Figure 4.67 example of featherweight 1950s-60s (2011)

a)  (b)  (c) 

Figure 4.68 late 1950s and early 1960s examples of (a) Zephyr, (b) petalweight, (c) tie-cloth (2011)

The range cards held further details about these qualities in terms of their inches/oz. However a document (TMA, late 1950s) which listed five of the eight qualities (zephyr, special light weight, light weight, standard and coatweight) detailed the density of the cloths by giving their EPI (ends per inch) and PPI (picks per inch) enabling a better understanding of the differentiation between the qualities. A summary of this data has been put together in Table 4.1

Table 4.1 Summary of TMA's cloth weights: EPI and PPI

TMA cloth name	inches/oz	EPI (ends/inch)	PPI (picks/inch)
coatweight	10/11	16	13.5
standard	8/9	22	20
special lightweight	7	25	23
lightweight	6/7	24	22
zephyr	5.4	26	21

In conclusion, the fact that six of these nine labels were describing a lighter quality than the 'standard' cloth, showcased a tweed collection that was light not only by the nature

of the wool but also most probably driven by the manufacturer as an asset. By following the weights through the range books over the sixty year period there was a sense that the sophistication of the lighter weight tweeds was most prevalent during the 1950s and 1960s. This sense was backed up in the first interview with James Adie. He was questioned about the larger proportion of lightweight tweeds to heavier weighted tweeds. He explained that after world war II, in the 1950s and 1960s, good working relations with the spinners allowed them to acquire the finer quality of the Shetland wool to weave with, making finer and finer tweed qualities. The aim was to use less yarn in the fabric, reducing costs as well as fulfilling a demand in the USA market for lighter weight tweeds. He also reaffirmed that his tweed had been 100% pure and made the comparison between Shetland tweed and Borders tweed, describing the Shetland tweed as being woven looser with a softer handle due to the quality of Shetland yarn saying that it was the handle, feel and texture of the tweed which was the most important factor. (Interview 1 08/04/11).

4.4.2 Use of colour in the tweed

In identifying more specifically with the trends in colour use that were being documented the following descriptions were considered to code the photographs: natural colour, natural with blues, with greens, with yellow, natural with colours, dyed colour. These resulted in the following codes that capture more specifically the way the Shetland shade palette combined with colours other than the shades. These descriptors are illustrated with relevant images:

- Shetland shades (Fig. 4.69),
- mixed with naturals: dyed wools woven with the Shetland shades (Fig. 4.70),
- coloured: no Shetland shades (Fig. 4.71),
- Blues: a sub factor of both mixed with naturals and coloured. There was a predominance of blues across the tweeds. This was not the case for the yellows and greens, which were organised into the descriptors, mixed with naturals, or coloured (Fig. 4.72).

(a)  (b) 

Figure 4.69 examples of Shetland shades (a) 1920s, (b) 1936- 1941 (2011)

(a)  (b)  (c) 

Figure 4.70 examples of mixed with naturals (a-b) 1956, (c) 1936-1941 (2011)

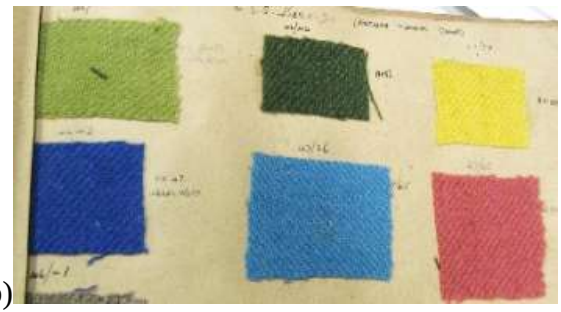
(a)  (b) 

Figure 4.71 examples of coloured (a) circa 1936-1941, (b) 1930s (2011)

(a)  (b) 

Figure 4.72 examples of blues (a) 1920s, (b) 1960s (2011)

By attributing all the photographs to one of these four colour descriptors, it was possible to appreciate the balance of colour being used in the tweeds. Although the process of photographing the tweeds was a randomised exercise, it provided a sample of coding that could be quantified by how many times each code was attributed.

Across the five hundred and seventy images taken of the tweed for CAT 8:

- two hundred and sixty one were coded ‘mixed with naturals’,
- two hundred and fourteen were coded ‘Shetland shades’,
- ninety-five were coded ‘coloured’ and
- within the coloured and mixed with naturals (three hundred and fifty-six images) one hundred and ten were coded ‘blues’ (almost a third).

Table 4.2 presents this data. The numbers do imply a sense of proportion in the use of colour, and they help to get a perspective on probable colour trends that had developed. The data suggests that the most used colour group was the Shetland shades, followed by the mixtures and then the dyed colours. However, it is the combination of Shetland shades with the mixtures and or dyed colours that appear to be the most prevalent. The colour blue would seem to be the most used dyed colour, especially in the early years of TMA tweed production.

Table 4.2 Quantified: colour descriptors coded through CAT 8

Review of colour across 15 sample books spanning 60 years through 570 photographs				
Factors			**Sub-factors**	
Shetland shades (naturals)		214		
mixed with naturals (Shetland shades)		261	blues	110
coloured		95		
	total	*570*		

4.4.3 Design effect of the tweed patterns

The descriptor highlighting was the first code considered as a way of describing an aspect of the tweed’s design effect often seen through a common twill check. The second descriptor that followed was depth, to look at the layering of colour and pattern through the tweed, which had already been used to describe the effect of Fair Isle patterns and the impression of Shetland’s open landscape. This layering of pattern and

colour that produced the illusion of depth, could only really be achieved through a contrast in colours selected. In this way the descriptor contrasting emerged as a third element of the design effects but tended to recognise more the tweeds that had a strong dark-light element to them. Contrasting also aligned with other related descriptors, like contrastive in 'A landscape', recognising the strength of the northern light and contrasting in 'B1/B2 collections' describing shadows and opposing natural shades.

A further three codes which became apparent were descriptors shading, blending and factor light-medium-dark. Although essentially these three codes had been introduced in chapter 3 as methods through 'D making' they also accounted for the particular characteristics in the tweed and complimented descriptors depth, contrasting and highlighting. Below is a summary of all six codes with definitions of their descriptive qualities supported by illustrative examples.

- depth - refers to the tweeds that appear to have two or more patterns layered up in the fabric (Fig. 4.73).
- highlighting - refers to the tweeds that appear to have patterns highlighted in another colour (Fig.4.74).
- contrasting - refers to the tweeds that have a specific light – dark balance through the pattern in the fabric (Fig.4.75).
- light-medium-dark - refers to the tweeds in the Shetland shades group that showed use of a light - medium - dark balance of shades through a tweed fabric that could be any order across this spectrum (Fig.4.76).
- shading - refers to the tweeds that use a light-medium-dark or dark-medium-light (in these orders) balance through a pattern in the fabric (Fig. 4.77).
- blending - refers to the tweeds that are of a colour in the warp different from a colour in the weft, woven without a pattern (Fig.4.78).

(a)  (b)  (c) 

Figure 4.73 examples of a sense of depth (a-b) 1936-1941, (c) 1956 (2011)

(a)  (b)  (c) 

Figure 4.74 examples of a sense of highlighting (a) 1920s (b) 1930s (c) 1940s , (2011)

(a)  (b)  (c) 

Figure 4.75 examples of a sense of contrasting, (a) 1920s, (b) 1960s – 70s (c) 1960s, (2011)

(a)  (b)  (c) 

Figure 4.76 examples of a light-medium-dark balance (a) circa 1936- 1942, (b) circa 1928-1929, (c) 1956, (2011)

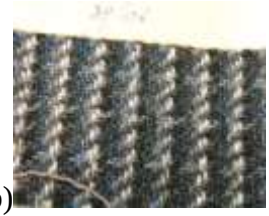
(a)  (b)  (c) 

Figure 4.77 examples of shading (a) 1920s (b) 1930s (c) 1956 (2011)

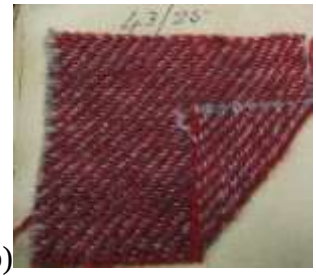
(a)  (b)  (c) 

Figure 4.78 examples of blending (a) 1920s, (b) 1943, (c) 1930s, (2011)

All five hundred and seventy images were attributed to these six codes and in some cases a tweed sample was coded with more than one. In this way, a perception of the trends in these design effects became more apparent, similar to the coding of the colours. It provided a way of diagnosing the experiential effect of the tweed, which was able to be read through the amount of times each code had been used and to some extent therefore it provided a sense of the most prevalent and least prevalent design effects used. These results have been laid out in Table 4.3. Contrasting came up the most and shading came up the least. Out of two hundred and fourteen tweeds that were coded as Shetland shades, just under half, ninety-three, were identified as having a specific light-medium-dark balance of shades across the tweed pattern.

Table 4.3 Experiential effect coded through CAT 8/ outcome 9

Assignment of descriptors across all 570 photographs		
Factors	**Descriptors**	
Shetland shades Mixed with naturals coloured blues	contrasting	230
	depth	164
	blending	156
	highlighting	102
	Light-medium-dark	93
570	shading	69

In sifting these codes through CAT 8, groupings started to appear where photographs were receiving up to three or four codes to describe them and it was here that the character of the tweeds through the interconnection with the codes started to emerge. The three descriptors, contrasting, depth and highlighting, worked together or in pairs. Shading was more aligned to light-medium-dark, but it also worked with highlighting. Blending was a more solitary code that connected with the factor coloured due to the mix of two colours within the fabric rather than a pattern.

The following combinations of codes start to exemplify the tweeds characteristics. They have been organised through the two colour descriptors Shetland shades (SLD) and mixed with naturals (MWN).

(1) Colour descriptor: Shetland shades (SLD)

- contrast, depth, highlighting (Fig. 4.79)
- contrast, depth (Fig. 4.80)
- contrast, highlighting (Fig. 4.81)
- depth, highlighting (Fig. 4.82)

(a)  (b)  (c) 

Figure 4.79 SLD effects of contrast, depth, highlighting (a) 1900s, (b) 1920s, 1960s (2011)

(a)  (b)  (c) 

Figure 4.80 SLD effects of contrast and depth (a-b) 1920s, (c) 1956 (2011)

(a)  (b)  (c) 

Figure 4.81 SLD effects of contrast and highlighting (a) 1900s, (b-c) 1920s (2011)

(a)  (b)  (c) 

Figure 4.82 SLD effects of depth and highlighting (a-c) 1936-1941 (2011)

(2) Colour descriptor: mixed with naturals (MWN)

- contrast, depth, highlighting (Fig. 4.83)
- contrast, depth (Fig. 4.84)
- contrast, highlighting (Fig. 4.85)
- depth, highlighting (Fig. 4.86)

(a)  (b)  (c) 

Figure 4.83 MWN effects of contrast, depth, highlighting (a) 1943, (b-c) 1956 (2011)

(a)  (b)  (c) 

Figure 4.84 MWN effects of contrast, depth (a-b) 1936-1941, (b) 1956, (2011)

(a)  (b)  (c) 

Figure 4.85 MWN effects of contrast, highlighting (a-c) 1936-1941 (2011)

(a)  (b)  (c) 

Figure 4.86 MWN effects of depth, highlighting (a- b) 1936-1941 (c) 1956 (2011)

Describing the tweeds through the codes was crucial to organising them into visually meaningful groups understood by particular characteristics or visual essences rather than by pattern constructions alone.

4.5 Summary

Gathering the data through the exploratory inquiries of ‘A landscape’, ‘B1/B2 collections and ‘C archive TMA’, whether it was done by text, drawn or photographic means, contributed to an experiential understanding of the context. This reflective approach provided a way of making intangible elements more explicit and accessible to work with in the practical inquiry’ D Making’, discussed in chapter 5. By adopting an interpretation of the coding strategy used in constructivist grounded theory, it drew attention to recurring factors and descriptors across the inquiries expressing observations and characteristics in the visual and written data. What it did not manage to code was the intrinsic use of colour in relation to the Shetland shades recorded on the TMA range cards. This particular element is addressed in a more forensic way in chapter 6.

Through documenting an aspect of the Shetland landscape, the changing intensity of the light dominated. This set the scene for ‘B1/B2 Collections’ and ‘C Archive TMA’. In ‘B1/B2 Collections’ the more dominant thread was the use of a light to dark spectrum through natural objects and textile patterns. In researching ‘C Archive TMA’, a lightweight cloth was a predominant factor of the tweeds woven through a light to dark spectrum evoking depth, highlighting and contrasting impressions. Looking at the context from these three different angles helped to provide a much richer sense of the experiential impact. Depth, contrasting, highlighting, shading and blending were descriptors that repeatedly occurred through all three exploratory inquiries and started to provide a sense of the kind of design effects to experiment with constructively, through practical means.

Chapter 5- Conduct of inquiry ‘D Making’

5.1 Introduction

The conduct of ‘D Making’ drew on methods of practice found in ‘C Archive TMA’/ SM store material, evident in the range books, range cards and range cloths. These presented examples of range building, and sampling of tweed ideas using techniques of working with colour traditional to the Shetlands in blending and shading (as discussed in 3.4.6). Relying on a constructivist approach, these methods were adopted within the parameters of plain knitting and weaving a 2x2 twill with four shafts using between five and nine J&S Shetland wool shades. Each make correlated with the detailed, coded, visual material from CAT 1, CAT 7 and CAT 8 of the exploratory inquires (see matrix U, Table 3.9). These correlations exemplified by the assigning of the factors and descriptors is summarised in Table 5.1 in relation to the makes.

Table 5.1 summary of factors and descriptors accumulated in matrix U

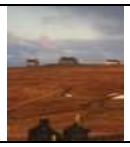
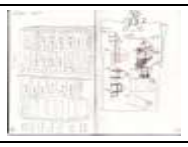
‘D Making’	**inquiry A, B, C**		**essence/ matrix**
	Factors	**Descriptors**	
make 1	tweed, Fair Isle, range cloths, rowers, sheep, wool, lace, seashells, beach stones	Shet’ shades, treeless blending, shading, open landscape land-sea-sky, cream-beige-bro’n-grey, dark to light, shadows,	wool blending & shading Matrix V
make 2	range books, range cards over/, heavy/coat weight featherweight, petalweight lightweight, special lightweight, zephyr, standard, tie-cloth		wool quality Matrix W
make 3	Midhouse, seashells, boat panels, birds eggs, summer, naturally discarded objects, croft, potato digger, range cloths range books	remoteness, dilapidated, natural shades, creams, beiges, browns, derelict, scattered, blending, shading, light-med-dark	discarded & dilapidated Matrix X
make 4	herringbone, Gutcher, winter, seashells, Fair Isle, lace, ropes and knots, beach stones	shading, contrasting, inside-out, depth, contrastive, interlacing,	depth in the landscape Matrix Y
make 5	Basta Voe, seashells, ropes and knots,Cunnister, summer,evening, sunset, range book, beach stones, grass	linear route, layering, depth, contrastive/ing skyline, horizon, sunlit, silhouetted, highlighting	depth, contrasting highlighting Matrix Z

Table 5.1 also shows the five essences that emerged expressing the sifted visual material portraying characteristics from the context connecting the five matrices to the five makes. Ultimately, these essences came out of the coding process, were made vivid by the visual documentation, and were explored through the activity of making. Therefore, each make in this chapter is introduced by the essence that describes it and the correlated visual material presented in its matrix. Where appropriate the author's writings in relation to the context are quoted with the reference RJ (reflective journal) and a date.

5.2 Make 1: Wool, blending and shading

The forty-five knitted squares produced for this make (Fig.5.1) referenced early visual documentation and developing codes in the exploratory inquiries laid out in matrix V (Table 5.2). It looked at gradation of shading from dark to light to dark across the browns through white and back out to the greys. These observations were taken forward into make 1, initially pre-empted by early reflections on the research context to instigate practice, '*Experimental colour forms: make a collection of knitted 'colour stories' working with Shetland wool and its variety of shades.'* (RJ 31/05/11).

Table 5.2 Matrix V, essence: wool blending and shading

matrix U co-dnts A1,2,3,5	**matrix V: wool, blending and shading**			
inquiry	**'A'**	**'B1'**	**'B2'**	**'C'**
descriptors / factors	open landscape land-sea-sky treeless	dark-light, shadows cream-beige-brown-grey	Sh' shades blending, shading	dark-light Sh' shades shading
sheep, rowers, wool				
seashells Fair Isle				
range cloths				
lace beach stones				

The graphic representation of the knitted squares (Table 5.3) shows the complete scope of blended combinations laid out in a dark-light-dark shading format. Each of the nine shades in this representation is attached to the lable given it by J&S (Table 5.4). These nine shades covered a similar spectrum to TMA's shade card of the 1950s- 60s (Fig. 3.9 a-c) and therefore provides further understanding towards the kind of spectrum TMA would have relied on in their tweeds. In order to get a perspective on these nine shades, a comparison has been made with the wheel of rowers in the TM (Fig. 5.2). The wheel of rowers has thirty-six different natural shades across four colour groups with nine shades per group: white to grey, light beige to dark beige, russets to browns. An initial point to be made here is that if all thirty-six of these shades were knit with each other, a further one hundred and forty-four could be created.

This wheel of rowers also illustrates the variety of shades that once came from a flock of Shetland sheep. It has provided a benchmark for the spectrum offered by J&S and once used by TMA. A review of these three Shetland shade palettes would suggest nine shades is the leanest expression of the Shetland shades: four beige to brown, four dark grey to light grey and white. The forty-five knitted shades put together for make 1 has provided the widest array of possibilities across these shades.

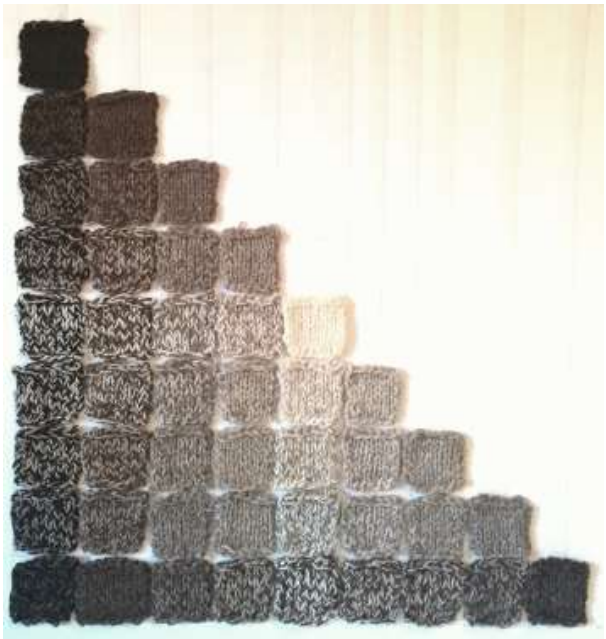


Figure 5.1 make 1/forty-five knitted squares from nine shades (2017)

Table 5.3 Graphic representation of the forty-five knitted squares laid out in Figure 5.1

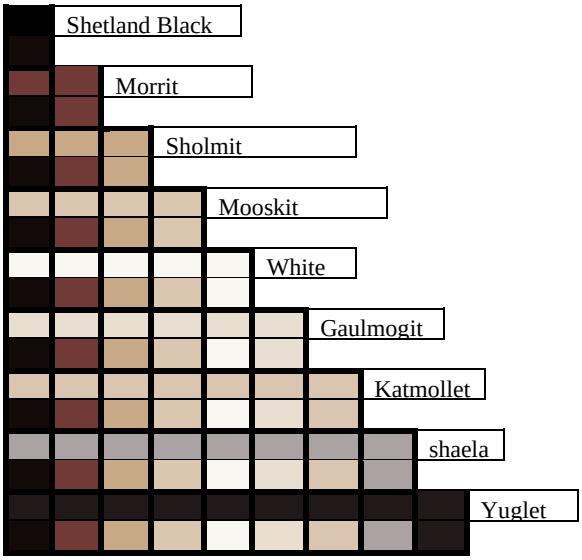


Table 5.4 Comparison of J&S jumper weight (JW) with TMA Shetland shades

Common name	N0.	shade	JW woollen	TMA 1950-60
dark brown	1		Shetland black	brown
brown	2		moorit	morrit
beige	3		sholmit	fawn
cream	4		White	white
pale grey	5		gaulmogit	1 grey
light grey	6		katmollet	3 grey
mid grey	7		shaela	3 ½ grey
dark grey	8		yuglet	4 grey
black	9			black
dusk	9		mooskit	

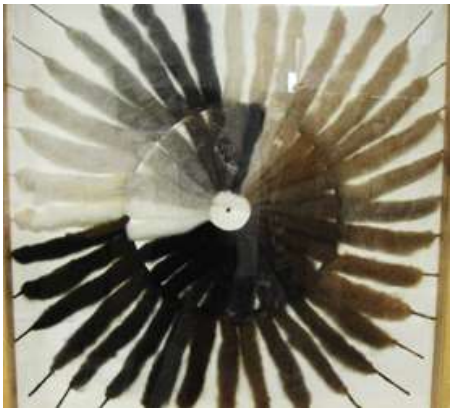
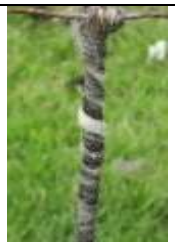
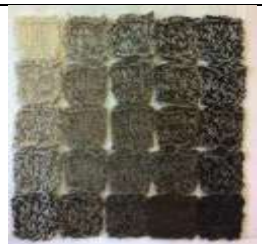


Figure 5.2 wheel of 36 natural shades in the form of rowers, rooed off Shetland sheep, 1920s-30s (2011)

5.2.1 Knitted colour blocks as a constructivist tool

The potential of this knit study lay in the use of the knit squares as shade blocks. These offer a constructivist approach to work with the natural shades within the parameters provided by the J&S jumper weight. A series of shaded blocks have been made in response to the developing descriptors and corresponding visuals documentation from the time of this make: shading, blending, dark-light, creams-beiges-browns-greys, treeless and shadows (Table 5.5).

Table 5.5 Natural shades across their spectrum in relation to visual documentation

  greys	  browns
  beiges-browns	  creams - greys
  blending, shetland shades	  dark-light, treeless
  shading, shadows	  dark-light, cream-beige-brown-grey

5.3 Make 2: Wool quality

This first weave project was conducted with the support of a volunteer weave technician at ASF Shetland. The initial aim was to experience each stage of the weaving process and understand the qualities of the J&S yarns when woven. This developed into a comparison of the lightweight yarns that were once used by TMA as identified in matrix W (Table 5.6) in relation to J&S's lightweight (LW). The AVL dobby loom was set up to weave two different structures (2x2 twill and 2x2 tabby) the same pattern in the same yarn across three different setts, adjusting the ends per inch (EPI) each time. This changed the density at which each sample was woven in relation to the structure. Table 5.7 presents the setts for the 2x2 tabby (Fig. 5.3) and table 5.8 shows the setts for the 2x2 twill/S diagonal (Fig.5.4).

Table 5.6 Matrix W, essence : wool quality

matrix U co-dnts: B5	**matrix W: wool quality, 'C archives TMA'**			
Factors/ inquiry 'C'				
range books, range cards over/heavy/coat-weight, standard, lightweight, special lightweight	 coatweight	 standard	 light-weight	 special lightweight
zephyr, featherweight petalwight, tie-coth	 zephyr	 featherweight	 petalweight	 tie cloth

Table 5.7 EPI and PPI specifications of test samples tabby (2x2 twill) reference with Figure 5.3

tabby (2x2 twill)	**ends and picks/inch (finished)**	
J&S's LW yarn cloth weight characterisation	EPI	PPI
a) compact weave (tight, stiff)	23	31
b) loose weave (light, stretchy bias)	19	19
c) open weave (very loose, floppy)	14	12

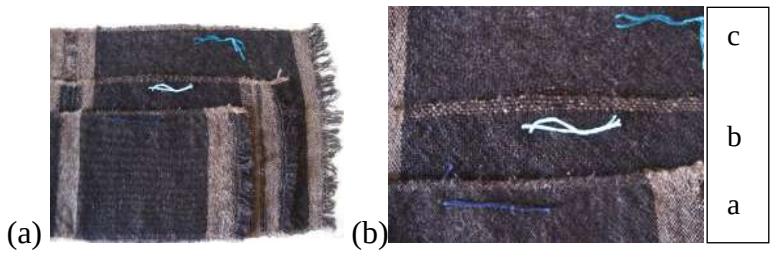


Figure 5.3 make 2: tabby (a) three setts woven (b) close-up of the three setts a) compact, b) loose weave, c) open weave

Table 5.8 EPI and PPI specifications of test samples S diagonal (2x2 twill) reference with Figure 5.4

S diagonal (2x2 twill)	**ends and picks/inch (finished)**	
J&S's LW yarn cloth weight characterisation	EPI	PPI
d) compact weave (tight, stiff)	23	28
e) loose weave (light, stretchy bias)	19	17
f) open weave (very loose, floppy)	14	12

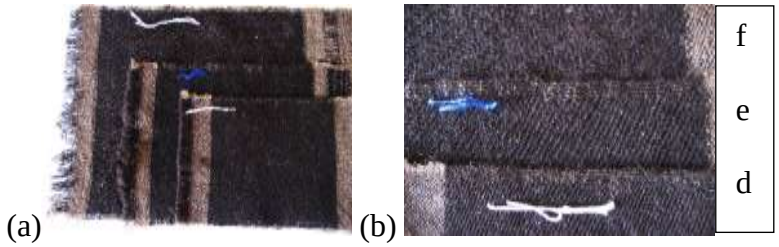


Figure 5.4 make 2: S diagonal, (a) three setts woven (b) close-up of the three setts d) compact weave, e) loose weave, d) open weave

5.3.1 The results of make 2

Table 5.9 shows a comparison between the author's 2x2 twill/S diagonal samples and TMA's data list of qualities (first shown in Table 4.1). This comparison suggests that against the measure of J&S's LW yarn used primarily for knitting, TMA appear to have had three qualities that were being used to produce lighter cloths: zephyr, special lightweight and lightweight.

Table 5.9 Comparison of fabric density/setts across TMA qualities and author's samples

comparison of fabric density/setts					
EPI	**PPI**	**TMA qualities** cloth label	**make 2: S diagonal** cloth character	**loosest to densest**	
				TMA	**Make 2**
26	21	zephyr		1st	
25	23	special lightweight		2nd	
24	22	lightweight		3rd	
23	28		(d) compact weave		4th
22	20	standard		5th	
19	17		(e) balanced weave		6th
18	??	featherweight		7th	
16	13½	coat-weight		8th	
14	12		(f) open weave		9th

Sample (d) 'compact weave' had a PPI that was clearly too high and had it been beaten in the warp more softly it might have been more in line with TMA's lightweight. Sample (e) 'balanced weave' was not far off TMA's standard and the sample (f) 'open weave' was too loose to justify as a quality tweed cloth, though interesting in its own right due to its lightweight and spongy aspect.

5.4 Make 3: Discarded and dilapidated

Make 3 referenced the visual documentation that started to describe impressions within the context, which is why the essence that emerged was discarded and dilapidated. It drew on the shades found in the dilapidated crofts and rusting farm machinery as well as the naturally discarded found in the landscape as shown in matrix X (Table 5.10). Following on from make 1, it identified the maximum of blending shades within the parameters of the J&S shade palette. The five lightweight shades were warped up in the order of the shade balance D-M-L-L-D as a way to construct and follow the progress of blending through each of the studies. Therefore Table 3.13 (a comparison of J&S and TMA Shetland wool shades on the colour cards) was added to with the shade intensity of light (L), medium (M) and dark (D) (Table 5.11) to provide a guide between what was being worked on the loom in relation to the TMA shade intensity in their tweeds. In this way make 3 was developed through a constant reference to Table 5.11 across the construction of the warp and the weaving of the weft.

Table 5.10 Matrix X, essence: discarded and dilapidated

matrix U co-dnts: C/1,2,3,4,5	**matrix X: discarded and dilapidated**			
inquiry	**'B1'**	**'B2'**	**'A'**	**'C'**
descriptors / factors	nat' shades,	creams, beiges, browns, greys	remoteness, dilapidated scattered, derelict	L-M-D blending, shading,
wool seashells range books				
naturally, discarded objects, birds' eggs				
summer, boat panels range cloths				
potato digger croft				

Table 5.11 L-M-D shade intensity added to compare J&S and TMA Shetland shades

common name	**shade intensity**	**shade**	**J&S jumper weight (JW)**	**J&S light-weight (LW)**	**J&S extrafine weight (EW)**	**TMA 1950's-60'**	**TMA 1991**
dk brown	D		Shet' blk	Sh' blk	Sh' blk	brown	brown
brown	M		moorit	moorit	moorit	morrit	dk morrit
beige	L		sholmit	sholmit	sholmit	fawn	fawn
cream	L		white	white	white	white	white
pale grey	L		gaulmogit			1 grey	1 grey
light grey	L		katmollet			3 grey	3 grey
mid grey	M		shaela			3½grey	3½ grey
dark grey	D		yuglet	yuglet	yuglet	4 grey	4 grey
black	D					black	black
dusk	L		mooskit				mooskit
dk sand	L/M						lgmorrit

5.4.1 The results of make 3 (studies 2, 3, 4, 8 & 9)

Study 2. (Fig.5.5) shows a 5x5 inches twill sample, construction details are listed below.

- Weave: a 2 x 2 twill, alternate S diagonal (16 pics), Z diagonal (16 pics) 5 times.
- Weft yarn: LW, shades woven in the following order, yuglet (D), white (L), sholmit (L), moorit (M) and Shetland black (D).

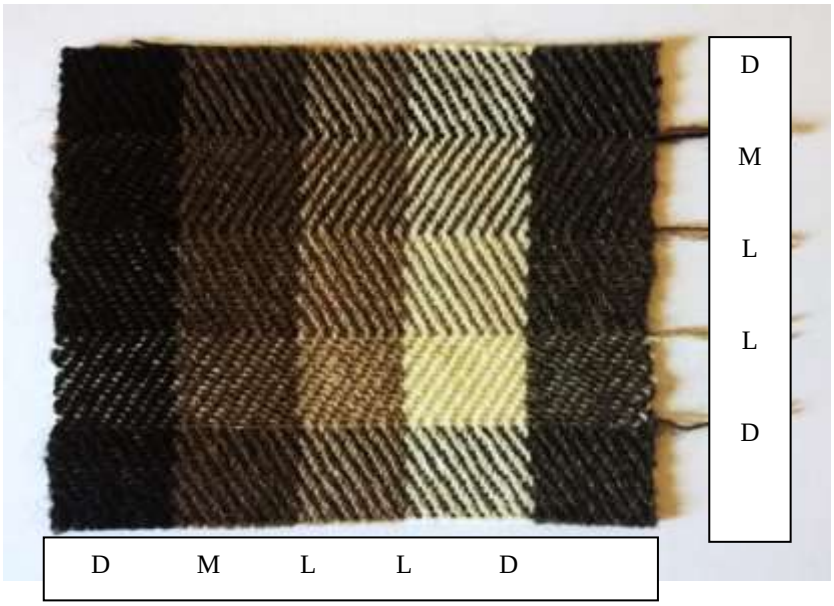


Figure 5.5 make 3/study 2

The weft mirrored the warp both in yarn and weave to produce twenty-five shaded squares.

- Five true shades run from the bottom right, along the diagonal to the top left where the same shade cross at the warp and weft.
- Ten blended shades were duplicated in reflection along the diagonal.
- Shading balance is mirrored along the diagonal from right to left with the order of DMLLD/DLLMD.

Shade study 3: (Fig. 5.6)

- Weave: tabby, 5x2 inches, 30 picks
- Weft yarn: EW, shades woven in varying orders, yuglet (D), white (L), sholmit (L), moorit (M) and Shetland black (D)

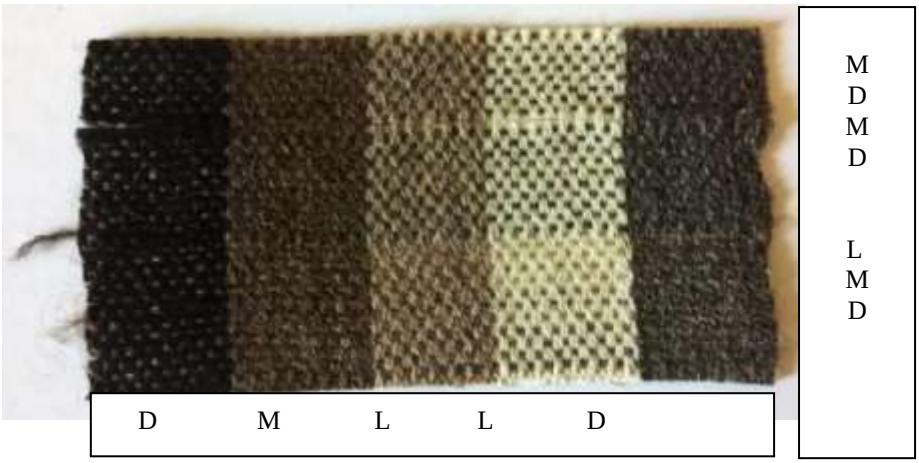


Figure 5.6 make 3/study 3

This sample made a lighter cloth than shade study 2 and was in keeping with the warp due to the same natural shades.

- The EW was so much finer in comparison to LW that three ends were woven in the weft together to achieve a closer balance with the warp.
- As there were three ends, one was changed at the beginning of every other pick to play with a level of shading through two variations: DML and DMDM.
- Although the study in itself did not create a sound woven cloth, what it did do was realise a sense of the finer weight cloths that TMA achieved in weaving special lightweight and zephyr.
- Shading balance was in two parts: DMLLD/DML and DMLLD/DMDM.

Study 4: (Fig 5.7)

- Weave: 2x2 twill, 5x3 inches, S diagonal in 12 stripes, each made up of 4 picks.
- Weft yarn: LW, first 6 stripes were alternating white with yuglet (L, M,) respectively; second group of 6 stripes were alternating moorit with sholmit (M, L) respectively.

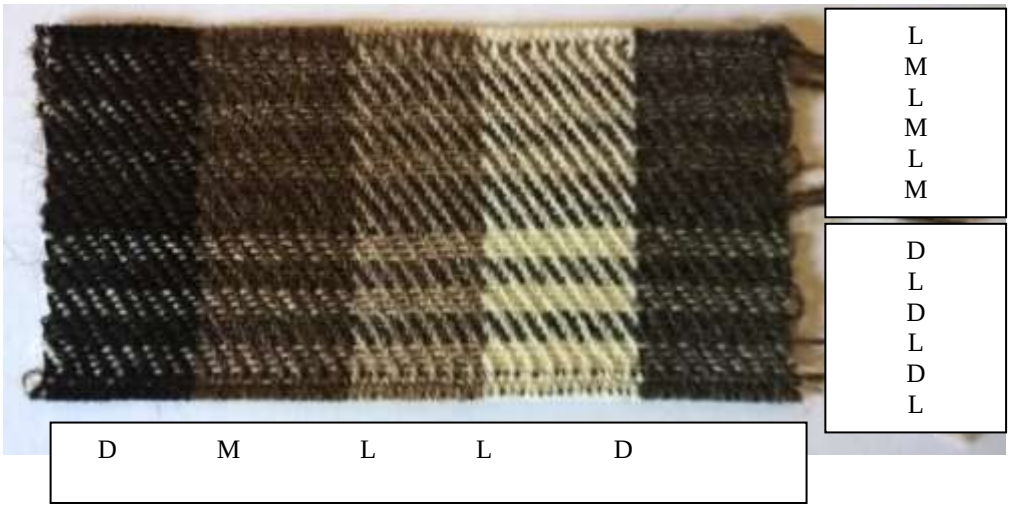


Figure 5.7 make 3/study 4

The study considered the simple process of bringing in a basic pattern such as striping to break up the blocks of shades in the warp. This created ten shaded effects each with their own balance of L-M-D shown in Table 5.12.

Table 5.12 Ten shaded effects illustrated through the L-M-D coding

D /MLMLML	M /MLMLML	L /MLMLML	L /MLMLML	D /MLMLML	L (Sholmit) & M (Morrit)
D /LDLDLD	M /LDLDLD	L /LDLDLD	L /LDLDLD	D /LDLDLD	(D) Yuglet & (L) White
D Shet black	M Morrit	L Sholmit	L White	D Yuglet	**Weft stripes**
Warp blocks of shades					

Balance across these combinations appeared to be when all three shades L, M and D, were used, although this was not always the case as is discussed over three of the combinations below and highlighted in red in Table 5.12.

- Shetland black warp: D/ MLMLML. All three shades were the three shades of brown with the darker of the shades in the warp and the lighter two in the weft. This combination started to express contrasting and depth effects.
- Yuglet warp: D/ MLMLML. Here the shades ‘D’ and ‘M’ are opposing shades (grey and brown), too close in intensity despite their gradation, and appear lost against each other.

- Morrit warp: M/ LDLDLD. In this scenario, the order of shades from warp to weft was not graduated through the shades, in complete contrast the order was mixed up. All three shades were from different shade scales. This combination started to express effects of contrasting without the depth.

Study 8: (Fig. 5.8)

- Weave: 2x2 twill tabby, $5 \times 10\frac{1}{8}$ inches, 1 1/8th (10 picks) each shade, 9 times.
- Weft yarn: JW, using all nine shades, Shetland black (D), moorit (M), sholmit (L), white (L), gaulmogit (L), katmollet (L), mooskit (L), shaela, (M), yuglet (D) (Fig. 5.8).

There were forty-five shades, with five true shades and forty blended shades. The shades squares in Figure 5.8 can be read by their intensity balance (L-M-D) shown in Table 5.13.

Table 5.13 L-M-D of study 8

DD	MD	LD	LD	DD
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DM	MM	LM	LM	DM
DL	ML	LL	LL	DL
DM	MM	LM	LM	DM
DD	MD	LD	LD	DD

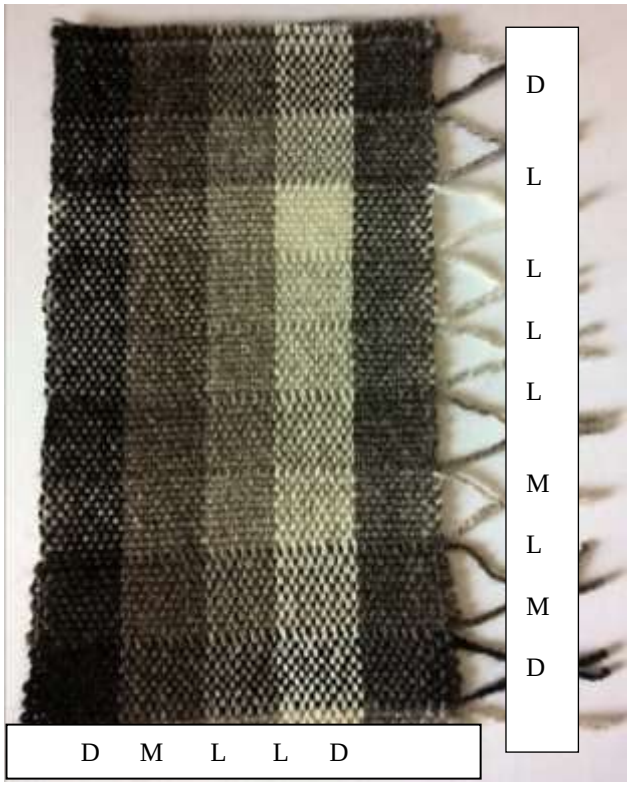


Figure 5.8 make 3/study 8

- The same number of shades were created as in make 1. However, the difference here was that there were more combinations of blended squares because the JW has five more shades than the EW. Therefore, there were less warp shades

working with almost double weft shades. This did open up the diversity and subtlety between the squares.

This study was not woven with consistent blending in and out of the dark to light shades. This imbalance through the warp has provided three sets of combinations to discuss, each set highlighted in a different colour, presented in Table 5.13.

- The combination highlighted in red is a perfect set of nine squares working from dark to light through the browns with three true shades through the diagonal left to right reading DD, MM,LL; an harmonious balance through the shades.
- The two combinations of four shades highlighted in green reflect their shade combination across their diagonal in different ways because of the pattern of the combinations. In the set, reading anticlockwise, MM, ML, LL, LM the light and medium shades are closer together and the variations complement each other. In the set, reading anticlockwise, LL, LD, DD, DL the light and dark shades are in contrast to each other, and the variations sit at either end of the shade scale.
- The two combination highlighted in blue read the dark to light spectrum through the four squares in different ways depending on the shade strength of the warp. The top right set, read clockwise, DD, MD, ML, DL through the browns has the light intensity softening the browns in this group. In the set in the bottom left the exact opposite occurs. Read anticlockwise, DD, DM, LM, LD through the greys the light intensity creates contrast through the squares opposite each other.

This study provided another version of building blocks as in make 1, which has been labelled study 8a. This is because study 8 was cut along the weft at every shade change producing nine stripes of woven tabby. The potential was in changing the order of the shades up the warp. In Figure 5.9 this has been done shading from the centre through the greys to the top and through the browns to the bottom creating a consistent blending in and out of the dark to light spectrum.

Table 5.14 L-M-D of study 8a

DD	DM	LD	LD	DD
DM	MM	LM	LM	DM
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DL	ML	LL	LL	DL
DM	MM	LM	LM	DM
DD	MD	LD	LD	DD

Figure 5.9 make 3/study 8a: shading from the centre out

The following two sets of four squares have been highlighted for discussion (Table 5.14).

- The red sets both show a gradation of shades. The bottom left red group have all the variables between dark to medium working anticlockwise: DD, DM, MM, MD. However, in the middle right red group is a lighter gradation but all the squares are annotated with LL, LL, LL, LL. This suggests that an L-M-D descriptor is not quite expansive enough to describe the subtlety of the shade changes in play.
- The blue sets are pretty much a mirror of each other, again working anticlockwise: DL, DL, ML, ML, and LD, LM, LM, LD. Although these sets appear to cover the LMD spectrum neither group have a twin annotation (DD, MM, or LL) to ground the gradation from a starting point through the squares. As a result, both groups sit quite flat without a sense of a light to dark spectrum.

Study 9: (Fig. 5.10)

- Weave: 2x2 twill, $5 \times 4\frac{5}{8}$. inches, 30 picks. Two ends were woven together in the weft on each pick. Similar to study 3 one of the ends of wool was changed every other pick.

  Weft yarn: JW, using five shades, sholmit (L), gaulmogit (L), mooskit (L), shaela, (M), yuglet (D).

Figure 5.10 make 3/study 9

This process provided a subtler shading in the weft.

- This shading effect was done in a D-L-M-L-D set, using three gradations of light shades: mooskit (mid brown), sholmit (light brown) and gaulmogit (extra light grey). This shading set up was repeated 4 times: (2 x D, 2 x M, 2 x L, 2 x M, 2 x D). A sense of Fair Isle shading was captured which is best expressed in the L (white) warp and the D (Shetland black) warp. In the L (white) warp the shading emerges and recedes while in the D (Shetland black) the shading is in contrast to the warp.
- D-M shading set was used with the greys: yuglet (D) and shaela (M). This set was repeated 3 times: (2 x D, 2 x M). This shading created a contrasting effect best expressed in the L (white) warp and a more nuanced shading effect in the D (Shetland black).
- These weft-shading patterns were lost in the other three warps: M (morrit), L (sholmit) and D (yuglet). This suggests that a good effect is created by the warp intensity either being in gradation to the weft or in contrast to the weft.

5.5 Make 4: Depth in the landscape

Make 4 was a small single woven study consisting of one tweed pattern, the herringbone. The potential of this pattern worked well with references to blending and shading with small motifs in Fair Isle due to its zigzag effect across the cloth. TMA had examples of such herringbone interpretations in their range books. The movement of shades through this tweed pattern from dark-medium-light-highlight-light-medium-dark, etc. not only reflected the approach to Fair isle pattern construction but it also seemed to echo the sense of '*depth coming out of the landscape'* (RJ 03/06/11) These references have been gathered together in matrix Y (Table 5.15).

Table 5.15 Matrix Y, essence: depth in the landscape

matrix U co-dnts: D1,2,3,4,5	**matrix Y: depth in the landscape**			
inquires	**'A'**	**'B1'**	**'B2'**	**'C'**
descriptors / factors	inside-looking-out, depth	depth, contrastive, interlacing	depth, contrastive, interlacing	shading, contrasting
winter Fair Isle herringbone				
seashells beach stones				
lace ropes and knots				

This woven study shown in Figure 5.11 looks at the consequence of the herringbone woven in the five LW shades in the weft: sholmit, white, yuglet, morrit and Shetland black. The layout of the shaded warp is shown in Table 5.16. The central row is in the Shetland black, identified as 'EE'.

(a)  (b) 

Figure 5.11 make 4/ single woven study of the herringbone pattern (a) in the weft sholmit, white and yuglet (b) in the weft moorit and Shetland black

Table 5.16 Layout of weft: dark, medium, light, highlight, light, medium dark etc.

Warp threading: EEDDDCCCBBBAAAEEAAABBBCCCDDDEE etc										
Key	Shetland black	E	yuglet	C	white	A	morrit	D	sholmit	B

5.5.1 The results of make 4

The following five diagrams show each of the five shades in the weft with the shaded warp against it alongside the woven equivalent. (Fig.5.12 a-e). This started to illustrate how different warp shades were coming in and out of the cloth depending on the weft shade. Where letters are not appearing in the diagrams it signifies the crossing over of the same shade from the warp and weft.

(a) Diagram 1: weft: sholmit

EAAA CCCDDDEEDDDCCC AAAEEAAA CCCDDDEEDDDCCC AAAE
EAAA CCCDDDEEDDDCCC AAAEEAAA CCCDDDEEDDDCCC AAAE
EAAA CCCDDDEEDDDCCC AAAEEAAA CCCDDDEEDDDCCC AAAE

(b) Diagram 2: weft: white

E BBBCCCDDDEEDDDCCCBBB EE BBBCCCDDDEEDDDCCCBBB E
E BBBCCCDDDEEDDDCCCBBB EE BBBCCCDDDEEDDDCCCBBB E
E BBBCCCDDDEEDDDCCCBBB EE BBBCCCDDDEEDDDCCCBBB E

(c) Diagram 3: weft yuglet

(d) Diagram 4: weft: Shetland black

(e) Diagram 5: weft morrit

Figure 5.12 make 4/five shades in the weft with a shaded warp against it: (a) sholmit weft, (b) white weft, (c) yuglet weft, (d) Shetland black weft, (e) morrit weft

In Figure 5.12 the two paler wefts in the sholmit and the white ((a) diagram 1 and (b) diagram 2) do not express the effect of the shading very clearly. In contrast, the three darker shades, yuglet, morrit and black ((c) diagram 3, (d) diagram 4, and (e) diagram 5) draw out the shading of the warp more successfully but each with subtly different effects.

- (c) Diagram 3: yuglet weft: the herringbone fades into the darker shades and is drawn out and made clearer by the paler shades.

- (d) Diagram 4: Shetland black weft: there is a distinct contrast between the darkness of its shade to the other paler shades in gradation making the herringbone. This sample is the most explicit in expressing the shading in the warp.
- (e) Diagram 5: morrit weft: the effect of the shading in the warp is present, however; the strength of the herringbone is weaker than the black sample.

It would appear that the more visually successful wefts are in the yuglet and the black; both providing a balance to the design effects of shading from dark to light, with the use of a central contrast within a repeat pattern. Yuglet is more in harmony with the warp shading whereas black is very much the backdrop to the herringbone pattern and creates a contrast to the warp shading. Both express a sense of depth in the pattern as the shading fades from dark to light with the effect of the herringbone coming out of the cloth. This is further illustrated by taking all the diagrams listed in Figure 5.13 and putting them together in their own table (Table 5.17), in the order in which the warp was set up A-E. It can be seen how this intensity changed and which of the wefts produced the best balance of colour intensity.

Table 5.17 Diagram of colour intensity across the make 4 warp

The herringbone study illustrated how a group of Shetland shades across the L-M-D spectrum could work against each other through the same pattern. The changing intensity of the weft against the D-L-D set up of the warp identified a point at which the balance of colour intensity was met between the warp and weft.

5.6 Make 5: Highlighting, contrasting and depth.

The descriptors depth, contrasting and highlighting characterised the TMA tweed samples in the range books and range cloths most consistently, as documented and catalogued in CAT 8. In parallel, descriptors contrastive, skyline, horizon, sunlit and silhouetted describe the Yell landscape in CAT 1. These codes started to interrelate, for example skyline and horizon evoking depth and sunlit and silhouetted expressive of highlighting along with linear routes and layering. These visual connections are set out in matrix Z (Table 5.18).

Table 5.18 matrix Z, essence: highlighting, contrasting and depth

matrix U co-rdnts E 1,2,3,4,5	**matrix Z: highlighting, contrasting and depth**			
inquires	**'A'**	**'B1'**	**'B2'**	**'C'**
descriptors / factors	contrastive, skyline, horizon, sunlit, silhouetted	linear route, layering	depth linear route layering	contrasting, depth, highlighting
Cunnister seashells summer				
beach stones grass				
ropes & knots evening, Basta Voe				
sunset range book				

Make 5 consists of seventeen studies, ten of which are laid out here in the results section for discussion. In order to track the six warps across each study through the woven cloth a table was made labelling the six warps A-F along the top and the ten studies selected 1-10 down the left side. This meant that each individual study had its own code for reference (Table 5.19). In the results section each of these individual studies have been referred to by their code. The author was then able to respond to the effectiveness of

each study using the descriptors depth, contrasting and highlighting as criteria to measure their character. This then enabled a comparison to be made between the author's coded studies and equivalent descriptions in CAT 8 of the samples documented from the TMA range books.

Table 5.19 Ten studies across three warp set-ups: total sixty trials

L=Light M=Medium D=Dark H'bone=Herringbone		**warps A-F using LW yarn**					
weft trials: 1-10		A	B	C	D	E	F
		4 x D 4 x L 7 times	6 x D 6 x D 5 times	2 x L 2 x D 6 times	8 x 8 H'bone M solid	8 x 8 H'bone stripe 2 x L 4x M 4 times	8 x 8 H'bone stripe 2xL 14xM 3 times
1	LW M/solid (52 picks)	A1	B1	C1	D1	E1	F1
2	LW (12 picks) L/solid	A2	B2	C2	D2	E2	F3
3	LW (12 picks) D/solid	A3	B3	C3	D3	E3	F3
4	LW (28 picks) (Dx2,Lx2) x 7	A4	B4	C4	D4	E4	F4
5	LW (Dx4,Dx4) x 3 (27 picks)	A5	B5	C5	D5	E5	F5
6	LW Lx16, (16 picks)	A6	B6	C6	D6	E6	F6
7	LW Dx16 (16 picks)	A7	B7	C7	D7	E7	F7
8	EW M,L,D varied, (28 picks)	A8	B8	C8	D8	E8	F8
9	JW (M-L-L-L-L-L-M) x 14) x 3 (42 picks)	A9	B9	C9	D9	E9	F9
10	JW (M-L-L-L-M-D-D-D)x3 (42 picks)	A10	B10	C10	D10	E10	F10

5.6.1 The results of make 5

The results have been discussed in numerical order by taking sequentially each grid reference. The points covered are the balance of the L- D- M on the warp and weft and whether this balance has either the effect of depth, contrast or highlighting, or a mixture of any of these three. The E and F warps produced the weakest results and in most cases these results have not been discussed due to this misalignment of the cream highlight shade.

Study 1 (Fig. 5.13)

- Weave: 2/2 twill, Z diagonal.
- Weft yarn: LW, shade: morrit (M)

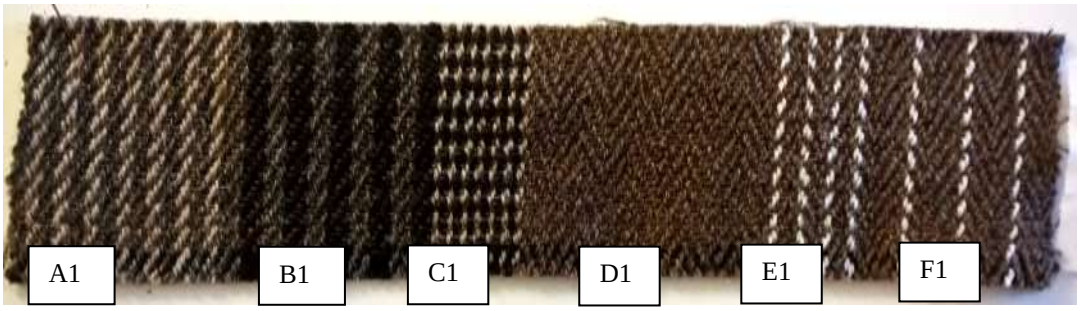


Figure 5.13 make 5/study 1: A1-F1

The balance across the three shades, the first two in each of the warps and the third in the weft are listed below.

- A1: D, L / M: the striped warp has a highlighted effect through the z diagonal of the tweed.
- B1: D, D / M: the striped warp has a highlighted effect through the z diagonal of the tweed.
- C1: D, L / M: the thinness of the stripes has effectively been crossed by the weft shade, creating a sense of contrast.
- D1: M/M: The two solids make a highlight of the herringbone pattern.
- E1: L, M/D: The warp highlight cream is misplaced and so there is no result.
- F1: L, M/D: The warp highlight cream is misplaced and so there is no result.

A1 and C1 therefore appear to be the most effective of the three. Significantly, these two patterns have the three shade intensities.

Study 2 (Fig. 5.14, bottom half)

- Weave: 2x2 twill Z diagonal.
- Weft yarn: LW shade: white (L)

Study 3 (Fig. 5.14, top half)

- Weave: 2x2 twill S diagonal.
- Weft yarn: LW, shade: Shetland black (D)

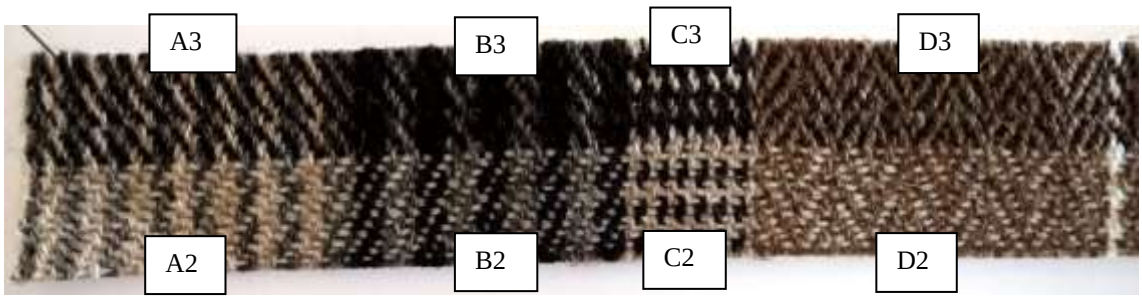


Figure 5.14 make 5/study 2: A2-D2 and study 3: A3-D3

The balance across the three shades, the first two in each of the warps and the third in the weft are discussed between weft 2 and weft 3 because these two are a mirror image and in shade contrast to each other.

- A2: D, L / L: the lightness of the weft appears to overlay the stripes in the warp, evoking one layer of pattern on top of another, creating depth.
- B2: D, D / L: the lightness of the weft appears to overlay the stripes in the warp, evoking one layer of pattern on top of another, creating depth but with more of a contrast due to the warp striping.
- C2: L, D / L: the lightness of the weft cross hatching the warp is broken up against the thinness of the stripes in the warp, creating depth with highlighted dark speckled effect.
- D2: L/M: the herringbone pattern in the warp has been highlighted by the lightness of the weft.

Mirror image and in contrast to:

- A3: D, L / D: the darkness of the weft appears to cut through the stripes in the warp creating, contrasting and highlight effects.
- B3: D, D / D, the darkness of the weft appears to sit behind the darker of the warp stripes, creating contrast and depth.
- C3: L, D / D, the darkness of the weft has broken up the thin stripes of the warp, creating light spots of contrast.
- D3: D/M: the herringbone pattern in the warp has been highlighted by the darkness of the weft.

The most ineffectual of these six pattern constructions is B3 where the shade intensity is the same across the warp and weft. The other five have identified with either one or two of the descriptors across differentiating balances of shade intensity between L and D.

Study 4 (Fig. 5.15)

- Weave: 2x2 twill, Z diagonal.
- Weft yarn: LW, shades: sholmit (L) and yuglet (D) in 2 and 2 pick stripe sequence.

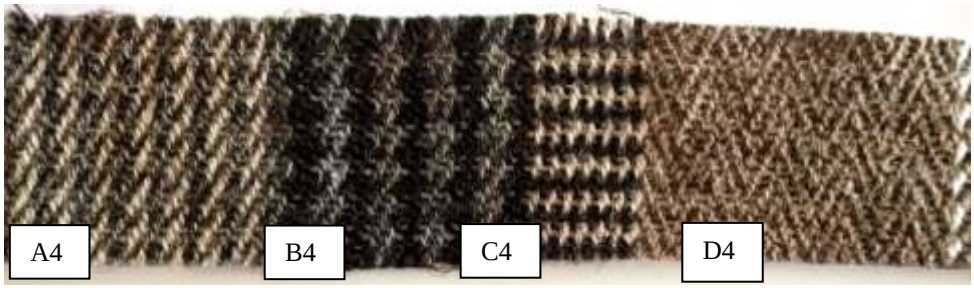


Figure 5.15 make 5/study 4: A4-D4

The balance across two shade intensities, two in each of the three warps and two in the wefts are:

- A4: D, L / D, L: with the warp shades reflecting the same weft shades, there is an effect of highlighting to the right of the darker warp stripes.
- B4: D, D / D, L: with the warp being darker than the weft, the weft striping has broken up the warp striping into a wavy effect creating contrast.
- C4: L, D / D, L: with the thinness of the stripes in the warp, the weft shades mirroring the warp shades, have given the effect of contrasting, horizontal striping.
- D4: M / D, L: there is little effect as the herringbone is only highlighted slightly

In just using the shade intensities L and D: A4 has created a highlighting effect and B4 and C4 have created contrasting effects.

Study 5 (Fig. 5.16)

- Weave: 2x2 twill, Z diagonal.
- Weft yarn: LW: shade Shetland black (D) and yuglet (D) in a 5 and 5 pick, stripe sequence.

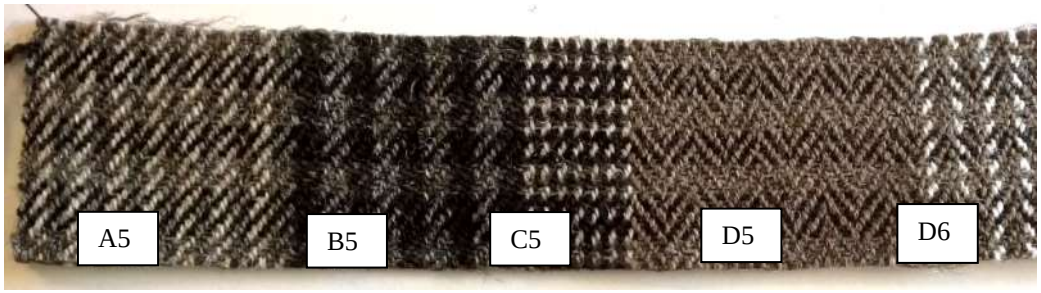


Figure 5.16 make 5/study 5: A5-D6

The balance across two shade intensities, two in each of the four warps and two in the wefts are:

- A5: D, L / D, D: with a light shade in the warp contrasting the darker shades, the check effect is highlighted in horizontal stripes with a sense of depth.
- B5: D, D / D, D: a dark check has been woven here with both the shades and width of stripes being the same, a reflection of eachother. The yuglet (D) against the Shetland black (D) does contrast and so the yuglet appears to sit behind the Shetland black creating a sense of depth too.
- C5: L, D / D, D: the thinness of the striping in the warp has been broken by the contrast of the weft creating horizontal striping, speckled with a predominance of Shetland black (D).
- D5: M / D, D: the contrast striping across the herringbone brings the herringbone pattern in and out of focus, with the darker shade highlighting the pattern.
- D6: L,M / D,D: there is a slight effect of depth as the warp highlights cross with the weft shades.

Study 6 (Fig. 5.17, bottom half)

- Weave: 2x2 twill: S diagonal (8picks), Z diagonal (8 picks).
- Weft yarn: LW, shade: white (Lx16 picks).

Study 7 (Fig. 5.17, top half)

- Weave: 2x2 twill: S diagonal (8picks), Z diagonal (8 picks).
- Weft yarn: LW, shade: Shetland black (D x16 picks).

A7

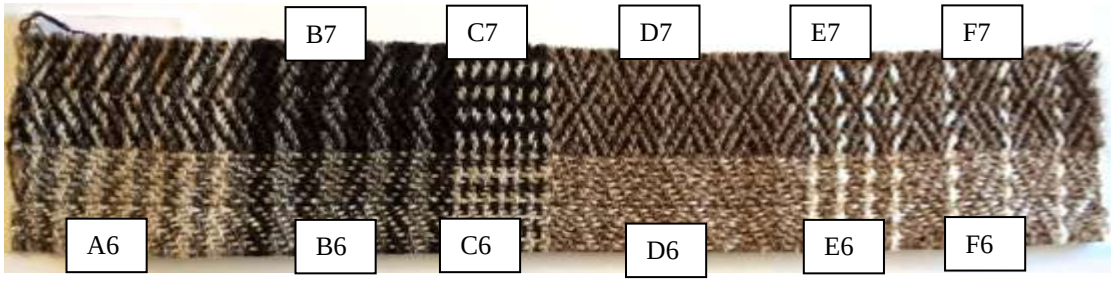


Figure 5.17 make 5/study 6: A6-F6 and study 7: A7-F7

The balance across the shade intensities with one or two in each of the warps and a third in the weft are discussed between weft 6 and weft 7 because these two are a mirror image and in shade contrast to each other:

- A6: D, L / L: the lightness of the weft across the striping is giving the effect of depth, drawing the pattern out of the warp.
- B6: D, D / L: the lightness of the weft is like a shadow over the warp, highlighting the pattern and imprinting it onto the warp creating depth.
- C6: L, D / L: the lightness of the weft breaks up the thinness of the striping in the warp, creating depth and highlighting.
- D6: M / L: the weave has highlighted a soft diamond pattern like a shadow in the tweed.
- E6 & F7: M, L / L: these two warps do not really work as the striping in the warp is too strong and badly positioned.

Mirror image and in contrast to study 7:

- A7: D, L / D: the contrast of the weft across the striping is giving the effect of depth, highlighting the twill across the warp
- B7: D, D / D: the contrast of the weft sets it behind the striping of the warp, creating depth.
- C7: L, D / D: the darkness of the weft breaks up the thinness of the striping, creating contrasting chequer effect.
- D7: M / D: the weave has created a diamond pattern highlighted by the darker weft bringing it into the forefront of the tweed.
- E7 & F7: M, L / D: with a balance of all three shade intensities across the tweed these two warps have potential to work if the horizontal highlighting were to be better positioned in the warp.

Study 8 (Fig. 5.18)

- Weave: tabby.
- Weft yarn: EW, woven with two ends in two sequences; the first: yuglet and sholmit (DL), the second sequence: white, sholmit (LL).

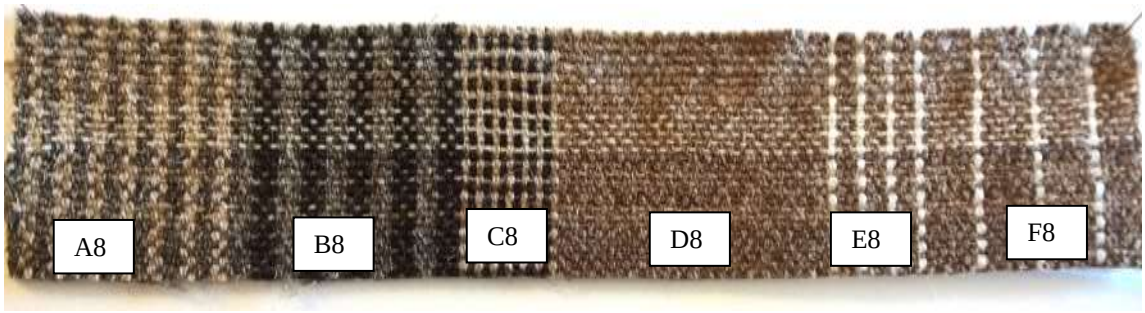


Figure 5.18 MK5/study 8: A8-F8

The balance across the shades, two in each of the warps and four in the weft are:

- A8: D, L / DL, LL: with half the warp in an L shade the subtlety of the weft shades is lost with only the striping of the warp most apparent, creating a simple highlighted effect.
- B8: D, D / DL, LL: The warp is evenly striped in opposing shades of two D's and the weft is a third in shade D and two thirds in shades of L, creating a speckled sense of depth.
- C8: L, D / DL, LL: the striping of the warp is so contrasting with shades L and D that the weft shades again are lost in the weaving.
- D8: M / DL, LL: with the warp a solid shade in M, the subtlety of the shades in the weft move in and out of the cloth as if to highlight the weft.
- E8 & F8: M, L / DL, LL: these two warps do not really work as the highlighting in the warp is too strong and badly positioned.

B8 and D8 have responded well to this very subtle trial. The simplicity of the tabby has allowed for the different shades to be seen together, moving away from the twill and any obvious textural pattern.

Study 9 (Fig. 5.19)

- Weave: 2x2 twill: S diagonal (8pics) Z diagonal (8 pics) 3 times.
- Weft yarn: JW, shades, two picks per shade in this sequence 3 times: morrit (M), mooskit (L), katmollet (L), gaulmogit (L), katmollet (L), mooskit (L), morrit (M)

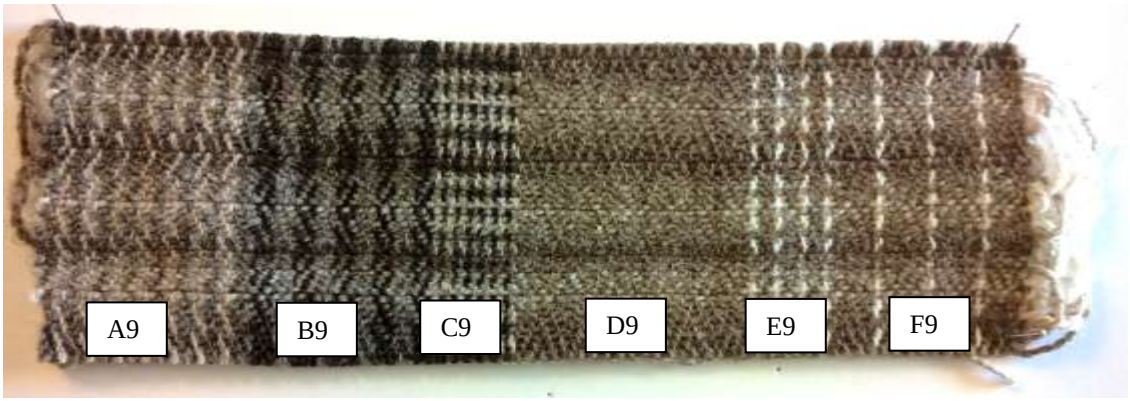


Figure 5.19 make 5/study 9: A9-F9

The balance across the shades, two in each of the warps and four in the weft are:

- A9: D, L / M, L, L, L, L, L, M: the shading in the weft works well with the striping in the warp making an effect of a light to dark to light zig-zag pattern. This creates depth in the cloth and both contrasting and highlighting through the pattern.
- B9: D, D / M, L, L, L, L, L, M: with the D and D stripe in the warp, a strong background for the M and L shades in the weft is created, shading through a zig zag that evokes depth in the cloth and both contrasting and highlighting through the pattern.
- C9: L, D / M, L, L, L, L, L, M: the close contrasting stripe in the warp has brought horizontally striped highlighting to the pattern.
- D9: M / M, L, L, L, L, L, M: with the solid morrit warp, the diamond pattern appears and disappears through the shades in the warp in subtle horizontal striping, creating depth and highlighting.
- E9 & F9: M, L / M, L, L, L, L, L, M: these two warps do not really work as the highlighting in the warp is too strong and badly positioned.

The shading pattern in the weft has an overall effect across all warps A, B, C, and D. B9 and D9 show a good harmony across their balance of shades.

Study 10 (Fig. 5.20)

- Weave: 2x2 twill, Z diagonal.
- Weft yarn: JW, two picks per shade across L, M, and D (except for 1 pick for the central L (white) and central D (Shetland black)): shaela (M), katmollet (L) and white (L), yuglet (D), Shetland black (D).

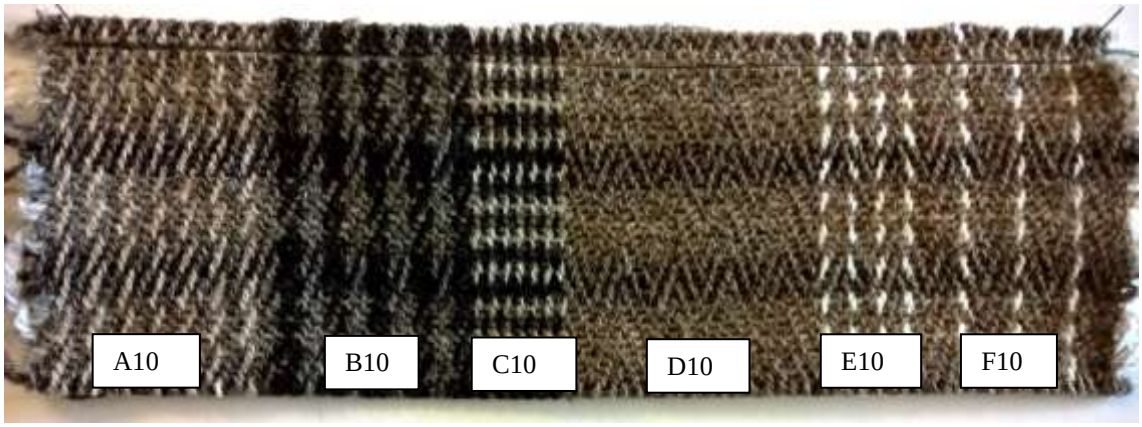


Figure 5.20 MK5/study 10: A10-F10

The balance across the shades, two in each of the warps and five in the weft are:

- A10: D, L / MLLLMDDD: the darker shading in the weft has had a striping effect with the warp, creating a fuzziness to the checked pattern with the effect of highlighting, contrast and depth.
- B10: D, D / MLLLMDDD: the effect of the darker shading in the weft has created a check with the warp making the pattern fuzzy, creating contrast and depth.
- C10: L, D / MLLLMDDD: the effect of the darker shading in the weft has broken up the thin stripes in the warp producing contrasting speckled weft stripes.
- D10: M / MLLLMDDD: the effect of the darker shading in the weft has highlighted the herringbone in a simple contrast stripe.
- E10 & F10: M, L / MLLLMDDD: these two warps do not really work, as the highlighting in the warp is too strong and badly positioned.

5.6.2 Summary findings of make 5

Table 5.20 brings together all the sixty effects that were created through make 5. Warps A, B, and C were the most successful in producing effects with the weft, warp D had some success, but warps E and F were not successful. The coding process helped to deepen an understanding of how the aesthetic of a tweed pattern is dependent on the balance between the yarn, its colour spectrum and the relationship between the warp set-up and the weft weaving.

Table 5.20 Summary of coding across all sixty trials

L=Light M=Medium D=Dark H'bone=Herringbone		**warps A-D using LW yarn**				
weft trials: 1-12		A 4 x D 4 x L 7 times	B 6 x D 6 x D 5 times	C 2 x L 2 x D 6 times	D 8 x 8 H'bone M solid	E & F 8 x 8 H'bone stripe
1	LW M/solid (52 picks)	highlight	highlight	contrast	highlight	none
2	LW (12 picks) L/solid	depth	contrast & depth	depth & highlight	highlight	none
3	LW (12 picks) D/solid	highlight & contrast	contrast & depth	contrast	highlight	none
4	LW (28 picks) (Dx2,Lx2) x 7	highlight	contrast	contrast	highlight	none
5	LW (Dx4,Dx4) x 3 (27 picks)	depth, contrast & highlight	contrast & depth	contrast	highlight & contrast	depth
6	LW Lx16, (16 picks)	depth	depth & highlight	depth & highlight	highlight	none
7	LW Dx16 (16 picks)	depth, contrast & highlight	contrast & depth	contrast	highlight	none
8	EW M,L,D varied, (28 picks)	highlight	depth	contrast	highlight	none
9	JW (D,M-L-L-L-M-D) x 14) x 3 (42 picks)	depth, contrast & highlight	depth, contrast & highlight	highlight & contrast	depth and highlight	none
10	JW (D-M-M-L-M-M-D-D)x3 (42 picks)	depth, contrast & highlight	contrast & depth	contrast	highlight & contrast	none

Drawing from this table each descriptor was then illustrated by the studies it related to. These results were gathered together in descriptor groups. The following criteria were set out to underpin these groups.

- *Highlight*: tweeds that appear to have patterns highlighted in another colour.
- *Contrasting*: tweeds that have a specific light-dark balance through the pattern.
- *Depth*: tweeds that appear to have two or more patterns layered up in the fabric.
- *Contrasting and depth*: two or more patterns layered up with a specific light-dark balance.
- *Highlighting and contrast*: a specific light-dark balance through the pattern with the pattern highlighted in some way.
- *Depth and Highlighting*: two or more patterns layered up with one of the patterns highlighted in some way.
- *Depth, highlighting and contrast*: two or more patterns layered up with a specific light-dark balance and one of the patterns highlighted in some way.

The first descriptor groups that have been looked at are the single descriptor groups: highlight: Table 5.21 (author's) versus table 5.22 (TMA), contrast: Table 5.23 (author's) versus Table 5.24 (TMA), depth: Table 5.25 (author's) versus Table 5.26 (TMA).

Table 5.21 Highlight (make 5 samples varied, reference codes see Table 5.20)

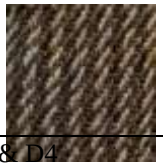
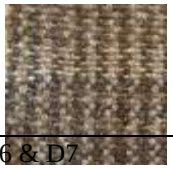
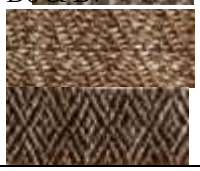
A1	A4	A8	B1
			
D1 & D4	D2 & D3	D6 & D7	D8
			

Table 5.22 Highlight (CAT 8 coded samples /TMA range books,)

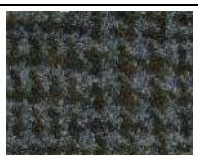
			
(a)	(b)	(c)	(d)

Table 5.23 Contrasting (make 5 samples varied, reference codes see Table 5.20)

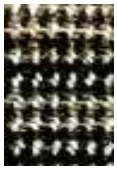
B4 	C1 	C3 	C4 
C5 	C7 	C8 	C10 

Table 5.24 Contrasting (CAT 8 coded samples /TMA range books)

 (a)	 (b)	 (c)	 (d)

Table 5.25 Depth (make 5 samples varied, reference codes see Table 5.20)

A2 	A6 	B8 	EF5 

Table 5.26 Depth (CAT 8 coded samples /TMA range books)

 (a)	 (b)	 (c)

- In review of this group of single descriptors there is a simplicity to the weaves in general across both the author's and the TMA samples.
- There is one layer of patterning that draws out the 2x2 twill structure through an over-check, stripe or contrast colour.

The second descriptor groups that have been looked at are the double descriptor groups: contrasting and depth: Table 5.27 (author's) versus Table 5.28 (TMA); highlighting and contrasting: Table 5.29 (author's) versus Table 5.30 (TMA); depth and highlighting: table 5.31 (author's) versus Table 5.32 (TMA).

Table 5.27 Contrasting and depth (make 5 samples varied, reference codes see Table 5.20)

B2	B3	B5	B7	B10
				

Table 5.28 Contrasting and depth (CAT 8 coded samples /TMA range books)

 (a)	 (b)	 (c)	 (d)

Table 5.29 Highlighting and contrasting (make 5 samples varied, reference codes see Table 5.20)

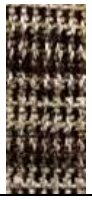
A3	C9	D5	D10
			

Table 5.30 Highlighting and contrasting (CAT 8 coded samples /TMA range books)

 (a)	 (b)	 (c)

Table 5.31 Depth and highlighting (make 5 samples varied, reference codes see Table 5.20)

B6	C2	C6	D9
			

Table 5.32 Depth and highlighting (CAT 8 coded samples /TMA range books)

 (a)	 (d)

- In review of the author's samples and the TMA samples the complexity of the patterning with the combined descriptors is starting to increase.
- There is a consistency in the descriptions of the TMA samples and the author's samples showing similarities in results.
- Highlight and contrast is similar to contrast and depth, but the difference would be that the contrast is brighter with the light and dark shades against each other.
- The tweeds have a subtlety with the shades closer together and few colours are used, no more than three.
- In some cases where the patterning would seem to be getting smaller in detail, there are no more than two shades.

The third descriptor groups that has been looked at is the triple descriptor group: depth, highlighting and contrasting: Table 5.33 (author's samples) versus Table 5.34 (TMA samples).

Table 5.33 Depth, highlighting and contrasting (make 5 samples varied, reference codes see Table 5.20)

A5	A7	A9	A10	B9
				

Table 5.34 Depth, highlighting and contrasting (CAT 8 coded samples /TMA range books)

 (a)	 (b)	 (c)	 (d)

- In review of the author's samples and the TMA samples there is an apparent complexity in the patterning with the triple descriptors.
- There is a consistency in the descriptions of the TMA samples and the author's samples showing similarities in results.

- Where depth, highlighting and contrast are used together, the tweed is woven in more than three shades and the balance of light medium and dark start to interact within the patterning of the cloth producing effects of blending and or shading too.

5.7 Summary

Make 1 used knitting to look at the infinite number of natural shades that could be made out of the J&S natural wool shades in their jumper weight. This provided constructivist colour building blocks to work with through the descriptors coming from the coded visual data.

Make 2 was concerned with understanding the wool quality although it was not possible to work with any of the qualities TMA would have used. It highlighted the fact that there are no contemporary indigenous Shetland woollen yarns for weaving to make appropriate comparisons.

Make 3 continued in the same vein as make 1 in working specifically with all the possible Shetland shade colour blocks but through weaving. In adopting the L-M-D descriptors to guide and describe the results in the make, it identified most significantly that L-M-D had its limitations in respect of the number of shades that could come from the Shetland shades. Therefore, maybe a more complex set of L-M-D descriptors would allow for the nuances between the shades and across the spectrum.

Make 4 illustrated one of the findings in make 3: that a build-up of shades is best grounded from a dark to light spectrum: DD-DM-MM-ML-LL. This was shown through building a pattern where the D-M-L shading in the warp was best supported by a D weft, allowing for the build-up of shading occurring.

Make 5 worked with the three descriptors most prevalent in the exploratory inquiries, which were depth, contrasting and highlighting. It helped to draw together the visual perceptions being made, especially the material coded from the TMA archives, with the practical experience of making through showing an accumulation of understanding through the woven results. A comparison between the coding of the make 5 studies and the coding of the TMA sample in the range books showed a developing complexity in the woven designs in relation to the number of attributed codes and a developing experiential understanding of the context.

Chapter 6 - Inquiry ‘C Archives TMA’ use of colour: 1957-1967

6.1 Introduction

One particular aspect that proved elusive in the method of coding through the factors and descriptors was the intrinsic use of the TMA colours organised into Shetland shades, Shetland wool mixtures and dyed Shetland wool in their combinations within the range cloths, documented on the range cards. In chapter 3, section 3.4.7 these colours were introduced and the method of recording these colours in the matrix T was explained. The purpose behind this colour study was to find a degree of rationality in the use of these colours. By singling out the colours on the matrix the complexity of the tweed structures through colour could be broken down further, thus providing a more specific set of building blocks to work with, within a constructivist context. This chapter presents and discusses the data from this matrix; however, the question of which sampling period was chosen to focus the research on use of colour is explained first and further insight on the TMA colours is presented to better contextualise the TMA approach to weaving tweed.

6.2 Selection of sampling period focusing on use of colour in the range cloths.

The initial question regarding the illusiveness of the colour descriptions was which range cards to decipher as they covered such an extensive period. Inquiry ‘C Archives TMA’ had identified two collections of samples in the range books (Fig.6.1) where the design element appeared more coherent and consistent than in other range books. These were in a range book labelled ‘42’, and in a bundle of samples called ‘Clippings from ranges 2207-2333’, both listed as sub-categories in Table 3.8.

(a) 

(b) 

Figure 6.1 two collections of samples from the range books identified for their aesthetic quality: (a) Bk 42, ranges March 1957, (b) clippings from pattern ranges 2207 to 2333 (2011)

The author made a connection between these two collections of samples,

> '…*the identified approximate date (*for the 'Clippings 2207-2333'*) is - 1956 because in* range *book, marked 42,* on *page labelled Ranges: March 1957* the *ranges start with no. 2334,* (the next number on from the clippings bundle). *1956 is significant… because it was crucially, a good financial year* (for TMA) *and it was also just before the embargo from U.S.A.'* (RJ 15/02/12,),

The bundle of clippings appeared to be an edited group of samples from the TMA range cards. There was continuity in aesthetic appeal from the clippings to the page in Book 42/ranges starting March 1957. The author's awareness of this transition was juxtaposed by the background knowledge that this period was both prolific and uncertain for TMA. The author's reference to '*a good financial year*' was due to a TMA business record which had recorded the tweed sales over a period of eighteen years from March 1955-56 to March 1972-73. This showed that the most profitable year was March 1955-1956 with sales of £61,371. This figure had then progressively reduced to £6,681 by 1971-72 and then rose a little to £9,843 by 1972-73.

In piecing together this documentary material the author felt that the collection of samples that started from March 1957 in Book 42 would be the most consistent to follow. TMA were at their peak financially with the tweed (not that they would have known this at the time) and the samples recorded in this range book from this date continued with a level of quality in the design content that appeared more progressive then what had been previously documented in the range books. Numbered sequentially from range 2334 to 3008 (but by no means inclusive of every number in-between) there were two hundred and fifty three range cards that could be matched to the tweed swatches in Book 42. This spanned about ten years. Initially the author photographed each of these samples and re-connected them to a photocopy of their range card.

This series of tweed swatches covered a variety of weave structures, the most predominant being the common twill and herringbone. An exact breakdown is set out in Table 6.1. This sample of two hundred and fifty-three tweed designs was too large to work on so the focus became the eighty-four common twills, which was also the largest group.

Table 6.1 Break down of names given to 250 ranges between ranges 2334 to 3008

name	**number**
common twill	84
herringbone	50
8 headle	27
fancy	19
diamond	12
chains	10
plain weave	10
no name	10
hopsack	8
6 headle	6
10 headle	4
seawave	2
3.2.1.2 twill	2
fish bone	1
shell pattern	1
window-pane check	1
check weave	1
3 headle	1
9 headle	1
12 headle	1
mayo twill	1
3.3.1.1 twill	1
Total sample	**253**

6.2.1 Further insight into the TMA colour palette

The Shetland shades and mixtures, presented side by side had a commonality which was the subtle variety of blending as discussed in chapter 3 section 3.4.5. One might have expected that in the Shetland shades this was a natural occurrence whereas in the mixtures it was manufactured. However, this was not the case. A document among the TMA production records (1958) indicated that the shades had been developed in the same way as the mixtures, showing in detail colour recipes for both shades and mixtures. It revealed that eight of the nine Shetland shades (white was not documented here) were an interpretation of the Shetland shades that clearly used to be extracted from the fleeces. They were in effect mixtures on the natural shade spectrum. As an example, their Shetland shade ‘4 grey’ (the darkest grey) was spun with 32% white Shetland, 23% black Shetland dyed, and 45% black M dyed. Their moorit, which is a classic Shetland brown shade was: 57% Shetland moorit and 43% Blend M moorit dyed. This information is laid out in the Table 6.2. It specifies the percentages of all mixtures used

to make up each of the eight natural shades. Highlighted in red is where a natural Shetland shade appears to have been used within each mixture. This suggests that across all eight of these Shetland shades the natural undyed shades made up just under half of these mixtures. In Table 6.3 are listed the recipes for the mixtures. It may explain why grouped in with the naturals were the more widely known mixtures: lovat and bracken. Included in the table are five of the coloured mixtures: mix 2, 3, 5, 7, and 10. Except for mix 2, these recipes each have a percentage of brown Shetland natural highlighted in red in the Tables.

Table 6.2 Recipe for TMA Shetland shades

Shades	
1 grey	6 ½ % sheila natural Shetland, 48 ½ % white Shetland, 45% white blend M
3 grey	30% white Shetland, 45% White blend M, 25% sheila natural
3 ½ grey	56% white Shetland, 44% Black M dyed
4 grey	32% white Shetland, 23% black Shetland dyed, 45% black "M" dyed
black	55% black Shetland dyed, 45% black M dyed
moorit	57% Shetland moorit, 43% Blend M moorit dyed
brown	28% brown Shetland natural, 29% Shetland white dyed, 43% brown blend M dyed
fawn	19% white Shetland, 26% white blend M, 19% fawn Shetland dyed, 19% brown blend M dyed, 17% natural moorit Shetland
lovat	39% smoke blend M dyed, 5% blue blend M, 20% blue Shetland dyed, 32% olive Shetland dyed, 4% brown Shetland natural
bracken	17% bracken Shetland dyed, 54% bracken blend M dyed, 17% brown Shetland natural, 12% white Shetland

Table 6.3 Recipe for TMA mixtures

mixtures	
Mix 2	37% fawn Shetland, 18% orange blend M, 27% indigo blend M, 9% sage Shetland, 9% green Shetland
Mix 3	50% yellow blend M dyed, 20% smoke Shetland dyed, 30% brown Shetland natural
Mix 5	42% brown Shetland natural, 21% light green blend M, 21% dark green blend M, 16% olive blend M
Mix 7	36% scarlet blend M, 31% brown Shetland natural, 7% dyed black Shetland, 20% green blend M, 6% scarlet blend M
Mix 10	22% dyed dark brown Shetland white, 43% brown Shetland natural, 25% tan blend M, 10% green blend M

That the Shetland shades were an interpretation of the original shades and primarily mixtures themselves shifted the perspective the author had on the tweed collection. It may well be the early tweeds were made in the originally spun Shetland shades. However, technical analysis would resolve that by the late 1940s, after WW2 at least, and due to the production demands from abroad during this period, these shades were being manufactured rather than extracted from the fleece.

One factor that may have influenced the direction that TMA chose to develop their natural shade colours to be more production viable was the presence of the Shetland Flock Book Society that was set up in the 1920s (Christiansen, 2019). This society, in an effort to manage more coherently a consistent Shetland sheep pedigree, created a list of sheep characteristics, which members had to adhere to with their own sheep. In this list is determined the shades of the fleeces that were acceptable, 'colours: white, black or brown, morrit (from reddish to fawn), greys (including sheila).' (Shetland Flock Book society, 1927) This set of shades bears a very similar resemblance to the TMA set of Shetland shades, suggesting that a simplification in the Shetland shade palette through breeding sheep might have had influence over textile production and by extension design. What is interesting to consider here is that at a time when decisions must have been made about viable colour and yarn production, the shades were retained as the core part of the tweed colour schemes. Therefore, they will continue to be discussed separately from the mixtures.

6.3 Matrix T data review

Matrix T (example extracts in Tables 3.15-3.18) recorded each time a Shetland shade, mixture or dyed colour was used within the eighty-four common twill range cloths. This provided a view on use of colour within each range and use of colour across all the ranges.

There were four sets of results drawn from matrix T, which have been laid out in a series of graphs, discussed in the following order.

- The balance of the colour groups (Shetland shades, mixtures and dyed) against each other across the eighty-four common twill ranges (Fig 6.2). This led to an in-depth review of use of each individual colour.
- The most prevalent and the least prevalent number of colours used (shades, mixtures, and dyed colours) within each common twill range (Fig 6.8). This led

to a review of each colour group from the most prevalent to the least prevalent number of shades, of mixtures, and of dyed colours.

- An overview of combinations of shades, mixtures, and dyed colours across the ranges (Fig.6.2). This led to a review of average ratio balances between the colour groups drawing out specific tweed swatches as examples.

6.3.1 The balance of the colour groups in relation to each other.

The graph (Fig 6.2) shows that the shades were selected for use in all eighty-four range cloths, mixtures in eighty range cloths and dyed colours in sixty-one range cloths. This has given an initial perspective on the relevance of each of these colour groups within the design of the common twill.

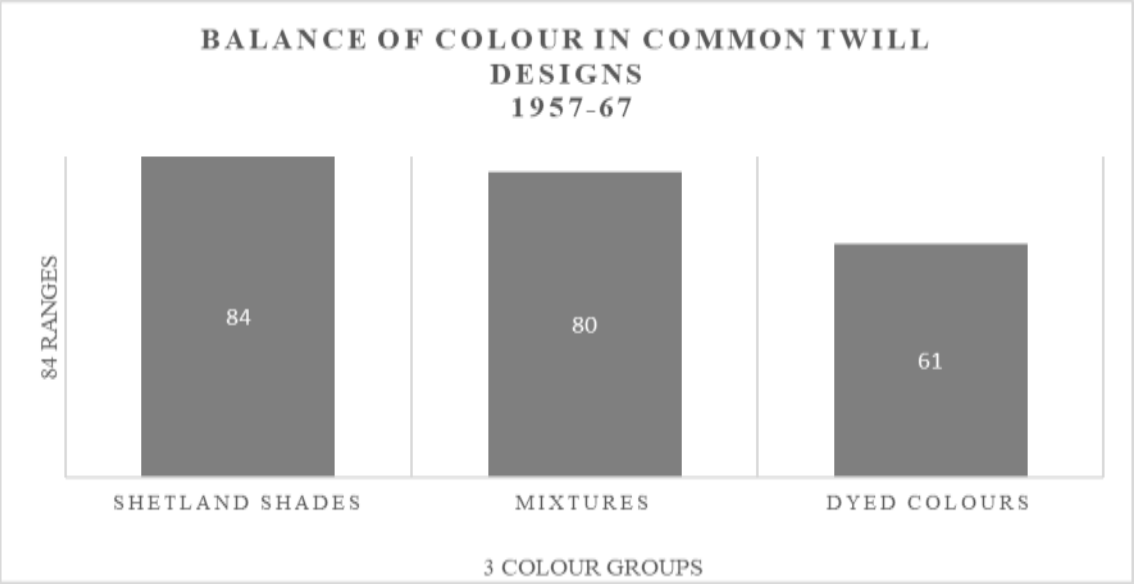


Figure 6.2 balance of use of colour in common twill 1957-67

This initial information also identified fifty-two colours that were used across the three colour groups. Therefore, use of each individual colour was able to be compared across this sample study. The following comparisons were made:

- first each colour in their individual groups (Tables 6.4-6.6), then
- each colour across the three groups (Table 6.7), and then
- the colours together as a palate of colours across the light to dark spectrum (Fig 6.3).

The first colour group reviewed was the shades (Table 6.4). The three most selected shades were two grey shades: 3.5 grey and 3 grey (sixty-four and sixty-two times respectfully) and brown shade morrit (sixty-one times). The darkest grey, 4 grey, was a close fourth (selected fifty-four times).

Table 6.4 TMA shades: the most used to the least used across all eighty-four ranges

label & digital colour	3.5 grey	3grey	morrat	4 grey	fawn	lovat	bro-wn	black	brack'	1grey	white
used	65	62	61	54	46	45	41	32	18	17	8

The second colour group reviewed was the mixtures (Table 6.5). Here the most selected mixture was a dark olive green (forty six times) followed close behind by a dark red and then a navy/dark blue, (thirty-nine and thirty-three times respectfully).

Table 6.5 TMA mixtures: the most used to the least used across all eighty-four ranges

label & digital colour	mix 3	mix 7	mix 10	mix 9	mix 2	mix 5	mix 4	mix 12	mix 1	mix 11	mix 13
used	46	39	33	30	28	26	23	22	13	12	11

The third colour group reviewed was the dyed colours (Table 6.6). Here the most selected colour was an olive green, (forty-three times). The second, selected half as much was a black (twenty-one times). Only a third of these dyed colours documented below were selected repeatedly.

Table 6.6 TMA dyed colours: the most used to the least used across all eight-four ranges

label & digital colour	A101	AV 99	AV 34	AV 36	AV 60	AV 53	A100	AV106	AV 66	AV58
used	43	21	20	17	17	10	7	7	6	4
label & digital colour	AV 31	AV103	AV102	AV112	AV 97	AV 50	AV 23	AV108	AV111	AV110
used	3	3	3	3	2	2	2	2	2	2
label & digital colour	AV 82	AV 67	AV 75	AV45	AV 78	AV 38	A113	AV 40	AV109	AV 33
used	1	1	1	1	1	1	1	1	1	1

In review of the results shown in Tables 6.4 – 6.6, a running order was made of all fifty-two colours from the most used to the least used shades, mixtures and dyed (Table 6.7). The ranking of the colours helped to get a sense of the relevance of the mixtures and dyed colours against the shades.

Table 6.7 All TMA colours (shades, mixtures, dyed): the most used to the least used

label & digital colour	3.5 grey	3 grey	morrat	4 grey	fawn	mix 3	lovat	AV 101	brown
description			mid brown			mid greens	greens to blues	olive	
used	65	62	61	54	46	46	45	43	41
order	1st	2nd	3rd	4th	5th	5th	6th	7th	8th
label & digital colour	mix 7	mix 10	black	mix 9	mix 2	mix 5	mix 4	mix 12	AV 99
description	mid reds	dark browns		mid blues	light blues	dark greens	dark blues	mustard	charcoal
used	39	33	32	30	28	26	23	22	21
order	9th	10th	11th	12th	13th	14th	15th	16th	17th
label & colour block	AV 34	brack'	1 grey	AV 36	AV 60	mix 1	mix 11	mix 13	AV 53
description	orange - red			mid green	red	light greys	browns	M-D blue	orange - red
used	20	18	17	17	17	13	12	11	10
order	18th	19th	20th	20th	20th	21st	22nd	23rd	24th
label & digital colour	White	AV 100	AV 106	AV 66	AV 58	AV 31	AV 103	AV 102	AV 112
description		black	M-D brown	dark brown	dark blue	dark green	mid red	violet	pastel green
used	8	7	7	6	4	3	3	3	3
order	25th	26th	26th	27th	28th	29th	29th	29th	29th
label & digital colour	AV 97	AV 50	AV 23	AV 108	AV 111	AV 110	AV 82	AV 67	AV 75
used	2	2	2	2	2	2	1	1	1
order	30th	30th	30th	30th	30th	30th	31st	31st	31st
label & digital colour	AV45	AV 78	AV 38	AV 113	AV 40	AV 109	AV 33		
used	1	1	1	1	1	1	1		
order	31st	31st	31st	31st	31st	31st	31st		

The following points have been revealed from this ranking.

- The top four colours selected fifty to sixty times remained the two grey shades: 3.5 grey and 3 grey, brown shade morrit and dark shade 4 grey.
- The top ten colours covered all the shades including lovat and brown (not including white and black), two mixtures which were a dark olive green (mix 3), a dark red (mix 7) and one dyed colour olive green (AV101).
- In comparison to the top ten colours, the second set of ten, ranking eleventh to twentieth covered one shade which was black, the mixtures in the rest of the blues, greens and reds and dyed colours in the greens and reds too.
- Looking at all fifty-two colours, half the colours were selected between eleven and sixty five times and the other half were selected between one and ten times.
- Within the top twenty-six colours, five of them were dyed and kept close to the spectrum found in the mixtures.
- Within the bottom twenty-six they were all dyed colours except for one shade which was white.

In light of these observations and a recognition that there were close versions of a colour between some of the shades, mixtures and dyed colours, a final review was made. All the colour groups were organised into their colour spectrums from light to dark. This review found the palette was of groupings of greys, blues, greens, browns, and reds (Figure 6.3).

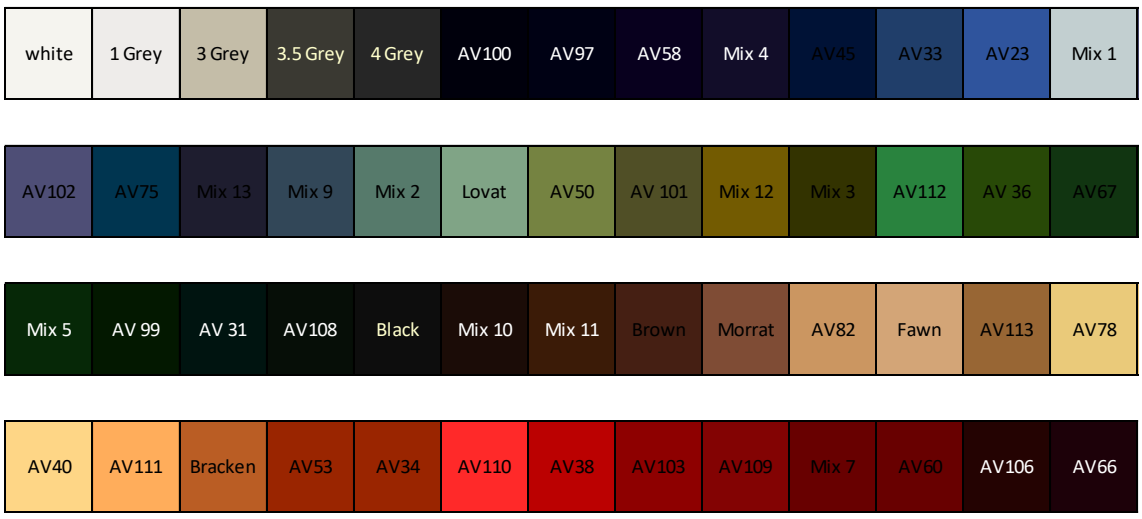


Figure 6.3 colour groups organised into their colour spectrums from dark to light

The close spectrum colours between the dyed and the mixtures and shades seem to be the following versions:

- three versions of dark/navy blue: AV100, AV97 and AV58,
- two versions of dark green: AV99 and AV31,
- two versions of dark brown: black and AV108,
- two versions of mid red: AV 103 and AV109,
- two versions of dark red: mix 7 and AV60,
- two versions of a deep dark red: AV106 and AV65.

6.3.2 The most to the least prevalent number of shades, mixtures, and dyed colours within each range

The graph below (Fig 6.4) shows the number of ranges that used certain numbers of shades, mixtures and dyed colours together.

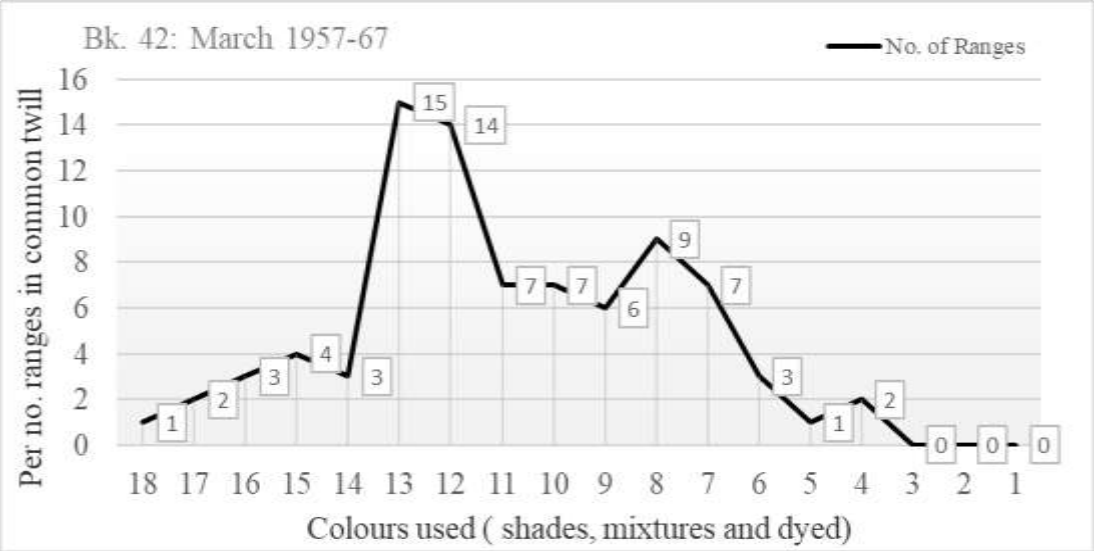


Figure 6.4 the most prevalent to the least prevalent number of colours (shades, mixtures, dyed) used within the eighty-four range cloths across fifty-two colours

The results can be split into four groups showing the following information.

- 7% (six ranges) used four to six colours. Just two of these ranges used four colours.
- 42% (thirty-six ranges) used seven to eleven colours. This scope is wide showing a spike of nine ranges that used eight colours.

- 34% (twenty-nine ranges) used twelve to thirteen colours. This result shows itself as a spike on the graph illustrating this concentration.
- 15% (thirteen ranges) used fourteen to eighteen colours. This scope is wide showing that just one range used as many as eighteen colours.

The results from Fig 6.4 were further broken down into the three colour groups separating out the shades from the mixture and dyed colours (see Fig.6.8).

Shetland shades: the graph (Fig 6.5) shows the number of ranges that used a certain number of shades.

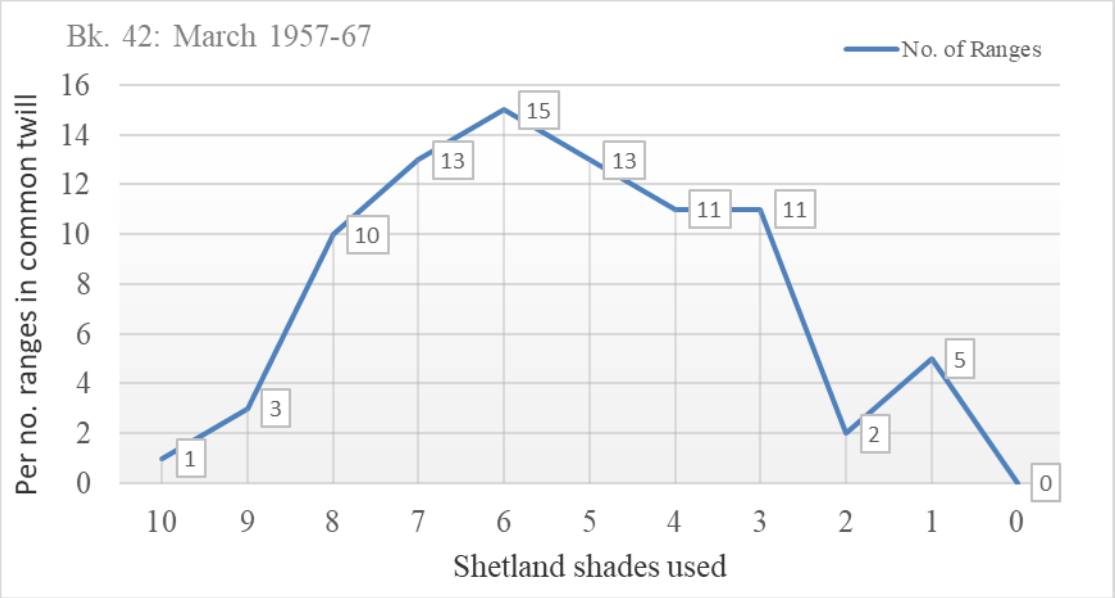


Figure 6.5 maximum, minimum and average number of shades used within eighty-four range cloths across eleven shades

The results can be split into the following four groups:

- 8% (seven ranges) used one to two shades with five of these ranges just using one,
- 42% (thirty-five ranges) used three to five shades,
- 45% (thirty-eight ranges) used six to eight shades,
- 5% (four ranges) used nine to ten shades.

The graph shows a predominant scope of between eight to three shades being used in seventy-three of the ranges. This scope peaks at fifteen ranges using six shades

Mixtures: the graph below (Fig 6.6) shows the number of ranges that used a certain number of mixtures.

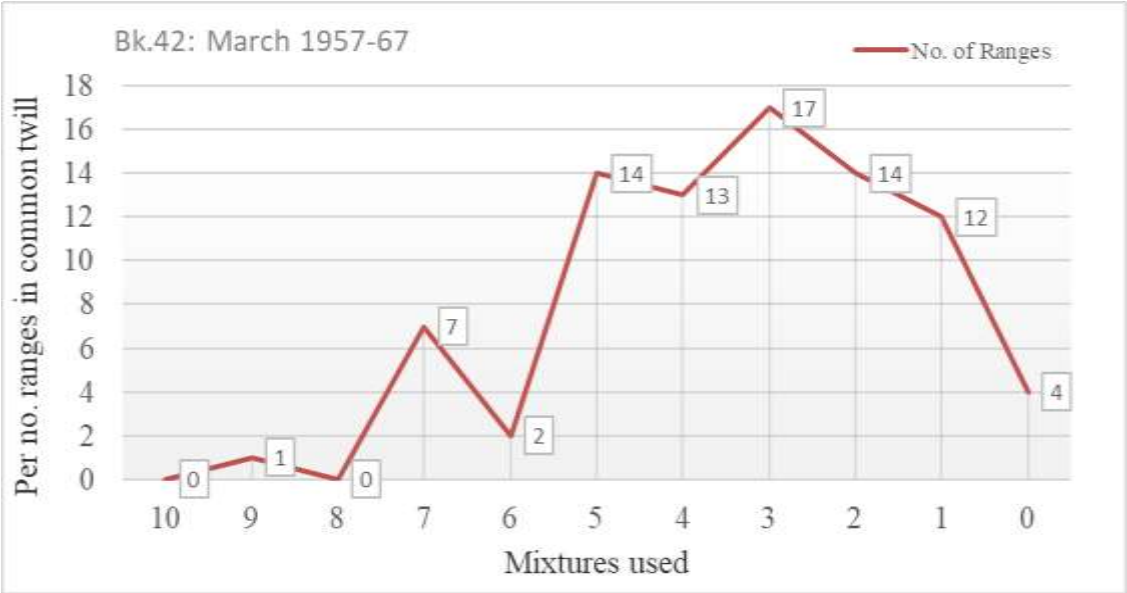


Figure 6.6 maximum, minimum and average number of mixtures used within eighty-four range cloths across eleven mixtures

The results can be split into the following four groups:

- 5% (four ranges) did not use any mixtures,
- 51% (forty-three ranges) used between one and three mixtures,
- 32% (twenty-seven ranges) used between four and five mixtures,
- 12% (ten ranges) used between six and nine mixtures with a spike showing seven of these ranges using seven mixtures and no ranges using eight mixtures.

The graph shows a predominant scope of between five and one mixtures being used in seventy of the ranges peaking at seventeen using three mixtures.

Dyed colours: the graph (Fig 6.7) shows the number of ranges that used a certain number of dyed colours.

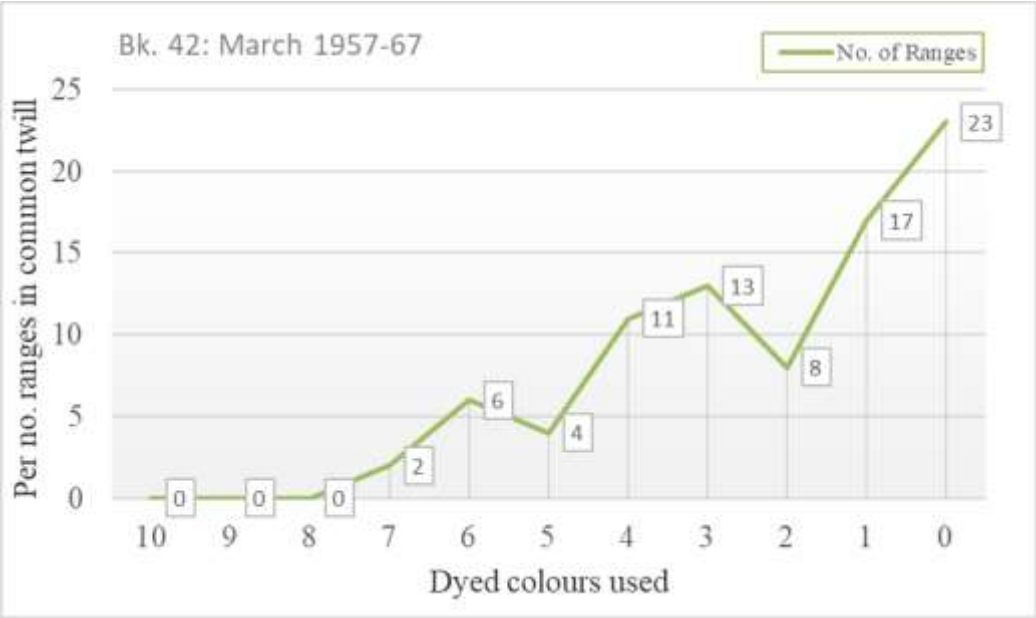


Figure 6.7 maximum, minimum and average number of dyed colours used within eighty four range cloths across thirty dyed colours

The results can be split into four groups:

- 28% (twenty-three ranges) did not use dyed colours,
- 20% (seventeen ranges) used one dyed colour,
- 38% (thirty-two ranges) used between two and four dyed colours peaking at thirteen ranges using three,
- 14% (twelve ranges) used between five and seven dyed colours peaking at six ranges using six.

The graph shows a predominant scope of between four and one dyed colours being used in forty-nine of the ranges peaking at seventeen ranges using just one dyed colour. This is not including the twenty-three ranges that do not use dyed colours at all.

The results shown in Fig 6.5, 6.6 and 6.7 provided a general sense of the balance of the three colour groups within groupings of ranges. The data from all three graphs were put together in a final graph to see trends in the ratios between the three colour groups (Fig.6.8).

6.3.3 Trends in ratio of shades, mixtures and dyed colours within ranges

The graph provides a sense of the ratio of the colour groups within a range. These ratios are identified below with examples taken from the range cards and their related tweed swatch, catalogued in Book 42. What this starts to show is a further complexity within the designs of how colour is being used subtly and discreetly to augment a tweed structure.

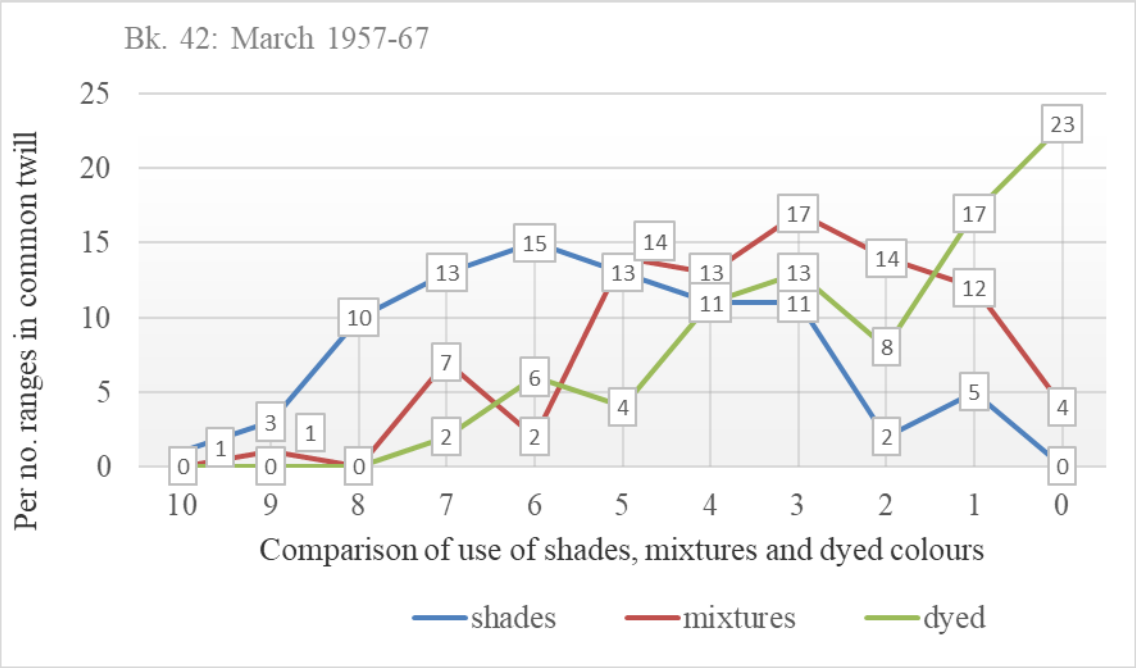


Figure 6.8 ratio of use of three colour groups together

Looking at the number of colours within a range the graph provides a sense of the balance across the colour groups

- shades 5-8 times, mixtures 1-5, and dyed colours 1 or 3-4 times.

This balance can be read as ratios working across the graph horizontally from seven to seventeen colours used. A third of the ranges (which totals twenty-nine) selected between twelve and thirteen colours across the three groups. Within this sample of twenty-nine ranges (although there is a cross section of ratios) the following examples start to look at the average ratio colour selections which help to build a sense of how these colours were being worked together. The ratios are in the order of shades - mixtures - dyed.

- Where twelve colours were selected the average ratio was 6:5:1(Table 6.8 and 6.10) and one range ratio in particular was 4:4:4 (Table 6.12).

- Where thirteen colours were selected the average ratio was 6:4:3 (Table 6.14), 6:3:4 (Table 6.16) and 6:5:2 (Table 6.18).

Ratio 6:5:1 / range card no. 2672

Table 6.8 Digital translation of colours as documented on range card 2672

spectrum	Colour selection across range cloth 2672						
light/dark	3 grey	mix 2	fawn	moorat	3.5grey	mix 3	mix 10
light/dark	mix 2 lovat	lovat AV101	3.5grey mix 3	mix 3 mix 10	moorat mix 11		
overcheck	mix 3	mix 12	4 grey	brown	fawn	mix 2	

Figure 6.9 range 2672/sample square 5E from range book '42'

Table 6.9 Digital colours: range card 2672/coordinates 5E

sample square: range cloth 2672 / 5E			
warp	fawn	moorit mix 11	brown
weft		mix 10	mix 12
spectrum	light	dark	overcheck

Ratio 6:5:1 / range card no. 2947

Table 6.10 Digital translation of colours as documented on range card 2947

spectrum	colour selection across the range cloth 2947					
light	3 grey	fawn	lovat	mix 9		
medium/dark	fawn moorat	mix 3 4 grey	mix 9 moorit	3.5 grey mix 3	3.5grey mix 13	
overcheck	lovat	mix 13	AV 101	moorit	mix 2	mix 4

Figure 6.10 range 2947/sample square 5E from range book '42'

Table 6.11 Digital colours: range card 2947/coordinates 5E

sample square: range cloth 2947 / 5E			
warp	mix 9	3.5grey mix 13	moorit
weft	mix 9	mix 3	moorit
spectrum	light	med/dark	overcheck

Ratio 4:4:4 / range card no. 2843

Table 6.12 Digital translation of colours as documented on range card 2843

spectrum	colour selection across the range cloth 2843							
light/dark	mix 1 AV101	3 grey mix 12	3 grey mix 2	fawn moorit	lovat moorit			
light/dark	mix 1	3 grey	fawn	lovat	AV 101	mix12	mix 2	moorit
overcheck	mix 13 AV 53	moorit AV38	mix 13 AV101	3.5grey AV53	mix12 AV36			

Figure 6.11 range 2843/sample square 5E from range book '42'

Table 6.13 Digital colours: range card 2843/coordinates 5E

sample square: range cloth 2843 / 5E		
warp	lovat moorit	mix12 AV36
weft	lovat	moorit
spectrum	light/dark	overcheck

Ratio 6:4:3 / range card no. 2902

Table 6.14 Digital translation of colours as documented on range card 2902

spectrum	Colour selection across the range cloth 2902				
light	fawn	3 grey			
dark	brown bracken	mix 10 bracken	mix 10 mix 12	4 grey AV36	4 grey AV102
overcheck	mix 3	mix 9	AV 101	moorit	

Figure 6.12 range 2902/sample square 5E from range book '42'

Table 6.15 Digital colours: range card 2902/coordinates 5E

sample square: range cloth 2902 / 5E			
warp	3 grey	4 grey AV102	mix 3
weft	3 grey	4 grey AV102	mix 3
spectrum	light	dark	overcheck

Ratio 6:3:4 / range card no. 2682

Table 6.16 Digital translation of colours as documented on range card 2628

spectrum	colour selection across the range cloth 2682				
ground colour	3 grey	3 grey moorit	3 ½ grey black	AV 101	3 ½ grey
over-check A	mix 9	AV 101	AV 60	mix 7	mix 4
over-check B	AV 53	4 grey	AV 58	black	bracken

Figure 6.13 range 2628/sample square 5E from range book ‘42’

Table 6.17 Digital colours: range card 2628/coordinates 5E

sample square: range cloth 2628 / 5E			
warp	3 ½ grey black	mix 7	bracken
weft	3 ½ grey	mix 7	black
spectrum	dark	over-check	over-check

Ratio 6:5:2 / range card no. 2728

Table 6.18 Digital translation of colours as documented on range card 2728

spectrum	Colour selection across the range cloth 2728				
dark	3.5grey	mix 3	moorit	4 grey	mix 10
Light/med	3 grey	mix 2	fawn	mix 9	AV101
stripe	mix 2	mix 9	mix 4	moorit	AV 53

Figure 6.14 range 2728/sample square 5E from range book '42'

Table 6.19 Digital colours: range card 2728/coordinates 5E

sample square: range cloth 2728 / 5E			
warp	moorit	3 grey	AV 53
weft	mix 10	3 grey	mix 3
spectrum	dark	light	stripe

In review of the results shown for range card nos. 2672, 2947, 2843, 2902, 2628 and 2728 the following points can be made.

- In laying out the digital colours across each range cloth the mood of the colours selected can be visualised and a sense of the balance of colour across the L-M-D spectrum is more apparent.
- There is a subtlety in the combinations of colour being used across the three colour groups, documented in the sample square range cloth tables (Tables 6.9, 6.11, 6.13, 6.15, 6.17, 6.19). These combinations show colour worked as accents but mostly as nuanced shading within the common twill design. This exposes the subtlety of use of colour which is not immediately apparent when looking at the actual samples recorded in the range books.
- There is a coherent use of light/dark or light/medium/dark with overchecks or stripes across the three colour groups working within the full L-M-D.
- The most revealing point to highlight is the subtlety and closeness of the colours being used within a sample. This aspect starts to suggest that the dyed colours were not only there to bring a contrast to the natural shades but were in many cases dyed to align with the mixtures and natural shades, maybe even for cost efficient reasons. This point is exemplified by the most used dyed colour AV101/olive selected forty-three times which sits close to mix 3/ mid green, selected forty-six times (Table 6.7). The second most used dyed colour was AV99/charcoal (Table 6.7), selected twenty-one times.

6.4 Summary

What this analysis has not done is reveal any tweed designs specifically selected by customers or recognised as best sellers. The data referred to has been very much grounded in the design thinking that went into making each range cloth rather than its success in the marketplace.

The study of use of colour in this particular group of common twill tweeds was another visual way of breaking down the elements that constructed the tweed. This quantitative insight identified trends in how these combinations of colour within the Shetland natural shades palette provided tweed design possibilities.

- The spectrum of dyed colours, varied within the blues, greens, reds and browns, was conservative.
- The dyed colours predominantly supported and enhanced the Shetland shades and mixtures.
- The mixtures supported and enhanced the Shetland shades.
- The Shetland shades were in effect mixtures and were expressive of the kind of Shetland shades that were extracted from the Shetland sheep.

As the research developed, it became apparent that although the author had selected a constructivist approach to define pragmatic parameters to conduct practice, it was not dissimilar to the way the range cloths at TMA had been conceived. This observation is illustrated in the similarity between a certain artwork created by Ann Sutton (Fig.6.15) and a particular range cloth by TMA (Fig.6.16) both examples evocative of a photograph of a rainbow taken by the author in Lerwick, a frequent occurrence due to Shetland's changeable weather conditions (Fig.6.17). Ann Sutton's and TMA's practical examples, though visually comparable, appear to have been conceived with different aims. Ann Sutton's artwork followed the colours of a rainbow through a constructivist structure revealing pattern and rhythm across the spectrum; whereas in the TMA range cloth the rainbow colour spectrum is pragmatic in ascertaining the design scope for further weaving. Clearly, the process of weaving, within the constraints of the warp and weft, lends itself to this rule-based method of working, which would equally suggest that the tweed examples by TMA are representative of a process of design thinking that evolves in a linear trajectory, evocative of TK.

Figure 6.15 Ann Sutton 'woven knitted spectrum', 1974

Figure 6.16 TMA range cloth 1950s, (2011)

Figure 6.17 rainbow stretching across the rooftops of Lerwick (2010)

Chapter 7- Conclusions and Future work

7.1 Conclusions of research

This thesis sets out to decode the nature of Shetland tweed - to explain its essences and to apply to its design an aesthetic calculus based on the mastery of the overall context in which Shetland tweed was created. In spite of the international renown that the product enjoyed in the fashion industry for a period in the 20th century, this exclusively local analytical approach breaks entirely new ground in understanding fully the creative inspiration that tells us what Shetland tweed actually is, taking into account the place, the raw material, the craftsmanship and the traditions that have become synthesised in its making. The four elements that compose the analytical model and shaped the objectives are:

- thorough absorption of Shetland's physical environment and landscape, the most abstract area of the research and the most challenging to codify;

- exploration of Shetland's traditional textiles in its museums and archives;

- scrutiny and examination of the exact nature of Shetland's previously unique wool;

- practical experimentation in knitting and weaving in order to experience at first hand the possibilities and limitations imposed by the nature of the wool and the processes of the craft.

The aggregated model was thus designed to provide in particular a multi-dimensional understanding of the roles that traditional, experiential, and prescriptive knowledge had contributed to the overall design aesthetic and to illustrate how that aesthetic could itself be deconstructed into its component parts, which in turn could be used as a framework to catalyse the interpretation of other similar cultural design contexts and circumstances.

Through this prism of scrutiny, a clearer understanding of a key Shetland tweed manufacturer's (TMA), aesthetic approach was able to be analysed and documented for the first time. It has shed new light on the influences and factors that effected the

aesthetic and technical decisions made in constructing a Shetland tweed during the mid-20th century. Clarity on the aesthetic nature of Shetland tweed made at this time by a significantly important Scottish tweed manufacturer re-establishes Shetland tweed's relevance within the Shetland woollens, reaffirming its identity as a product of cultural design.

7.1.1 Experiencing Shetland's environment as a context to Shetland tweed through visual methods

The documentation of the experienced effect of the Shetland landscape drew particular attention to the dramatic qualities of the ever-changing northern light on rugged topography of landscape and coastlines, subject to extreme changes of weather. In stark contrast, the gathered (rooed) wool of the unshorn sheep, resilient enough to survive these conditions, proved exceptionally light and flexible to handle.

However, archival research and the woollen textiles in the museum collections provided no literal or visual representation of the landscape. The author's own practical experience and exploration lead her to suggest that the crofters wove claith and then the weavers who came after them in the mills producing tweed were necessarily so close to, so imbued with, their natural surroundings that intuitively they responded to the subtle but ever-changing variations of atmosphere, scape, and season. They would have taken for granted the very objects collected, photographed, and drawn by the author, as an absolute of their habitat, not as a curiosity. Many of these objects seem to evoke their harsh environment: weather beaten, worn, used, and discarded. Their deterioration and resilience to the natural forces of nature were mirrored in the natural shades that built them, whilst every so often a flash of colour would appear, like the sun coming through the clouds or a rainbow emerging. The author suggests that it is these kinds of essences that were translated through the evocative use of shades and colour found in the Shetland tweeds. The translation is an intuitive dialogue with the indigenous landscape.

7.1.2 Exploring the cultural heritage museums to contextualize through visual methods Shetland tweed within the Shetland woollens

The research conducted in the cultural heritage museums specifically on pattern and use of colour opened up possible parallels in design thinking between the way Fair Isle and knitted lace were constructed in relation to the weave of a Shetland tweed. There appeared to be much more of a sympathetic link between these woollens than had been

previously documented. The fact that the larger manufacturers by the mid-20th century, such as T.M. Adie & Sons, John Tulloch, Shetland Products Ltd, and L.J. Smith, produced both Fair Isle and tweed on the same premises suggests that at the design stage there might have been a similar sensibility to both textiles from the point of view of pattern construction.

The unifying element of Shetland wool provided all the woollens with the same parameters in use of natural shades and dyed colours. Identifying the techniques of shading and blending found in Fair Isle, and to some degree the lace and hap shawls, introduced markers in how one might decipher visually the tweed samples in the archives. Significantly, these techniques were reflected through weave archive material in twisting yarn and constructing range cloths.

Knitted fabrics are constructed by incremental building blocks, and tweed is a preconceived interlocking structure. However, the particularity recognised between the Fair Isle patterns and the common twills can be seen more specifically between the allover Fair Isle designs and tweed checks. Both of these types of textiles rely on a bias construction, which means that the patterns, though built horizontally and vertically, also operate on the diagonals as well. These technical parameters define again the limitations of the designs but ultimately also their scope, a unifying element in this form of TK.

7.1.3 Studying the archives relating to the manufacture of Shetland tweed to focus and reference the research to inform practice

Researching the tweed-related archives in the SM store, (even though the perspective was necessarily from one manufacturer's mode of practice) provided a more coherent understanding of Shetland tweed's design of the cloth. This covered use of a woollen yarn, colour selection and a 2x2 twill construction. Shetland wool brought to its tweed a lightness to handle not replicated in other Scottish tweeds. It became clear that the use of colour was a significant characteristic: TMA paid great attention to their colour palette whether selecting natural shades for the mixtures spun or creating a range of dyed colours. The patterning of the cloth in a 2x2 twill manifested evident experimentation seen predominantly through the common twill and herringbone. These technical elements were underpinned by industry-approved methods in developing designs through trials and then range making, processed through range cloths and documented through range cards.

It was important to the research to piece together the design process that took place at TMA, for their own documentation contained nothing that classified the relation of the quality of their tweed to other Shetland tweeds. Identifying the process enabled the author to establish working methods relating to TK and started to provide the structures and parameters through which an understanding of design thinking could begin to take place.

The results in chapter 6 which looked at the TMA use of colour in a quantitative way, re-affirmed the results from the more qualitative approach taken to coding the visual material across a wider scope. These opposing methods complemented each other on a more general level, where both methods ascertained the proportionate relationship between the three colour groups. It supported the idea that experiential coding, as a way of making more explicit aesthetic characteristics, could inform practice.

7.1.4 Experiencing through practice the design qualities of Shetland's indigenous wool

The practical methods of knitting and weaving introduced the author to the fundamentally intuitive language and significant spectrum of natural woollen shades found within the fleeces of Shetland sheep. These shades had been a driving force in the TK, embedded across all the Shetland woollens, where up to thirty-six different natural shades had once been extracted from these fleeces. The Shetland shades spectrum came with two practical methods of blending and shading that extended the scope of how these shades might be used in a woollen product.

The parameters of just nine shades (a quarter of what had once been) spun commercially by J&S: four greys, four browns to beige, and white, provided a contemporaneous context in which to conduct the practical experimentations. Despite this restricted palette, the simplification of the scope of natural shades for Shetland woollen products had been pre-empted by the Shetland Flock Book society in 1927 and adopted for the production of tweed by TMA. An awareness of how this natural shade palette had evolved to the present day contributed to a richer understanding and appreciation for the scope of the light to dark spectrum that came out of the woven and knitted studies.

The results from make 2 highlighted the degree to which the quality of the contemporary woollen-spun Shetland wool differed from that spun through the 20th century and demonstrated that contemporary Shetland wool from Shetland is not

intentionally spun for weaving and by no means matches the particular quality that appears to have been spun for TMA.

7.1.5 Working through practical methods of making to develop an understanding of Shetland tweed's aesthetic construction.

The makes provided a space in which the various elements coming through the data could be trialled. Experimentation within the scope of Shetland shades, wool quality and pattern construction was correlated with the visual interpretation of the context, guided by the essences that had evolved. The descriptive process through coding enabled a more explicit correspondence to develop between the author as researcher and the intentionality of the three inquiries. In this way, the research was broken down into a series of effects translated through practice. This deconstructive-reconstructive approach provided the process with reflective material and constructivist outcomes grounded in the context as described in the following quote regarding constructivist art practice,

> '…the practicalness of making (the possibilities of technique) relevant to the practicalness of perceiving (or appreciating) relevant to the desirability of the first two situations at the same time of that of comprehension (or apprehension) relevant to the whole experience' (Hill, 1959, p. 273).

The experiential understanding drawn from the practical work denoted possible aesthetic characteristics in the Shetland tweed that are defined in the following principles:

- the ease with which a Shetland wool shade palette sits within an L-M-D design framework
- the use of colour as an enhancer and supporter to the wool's shades in line with the L-M-D design framework
- colouring the simplicity of the 2x2 twill structures through the guiding descriptors of 'highlighting', 'contrasting' and 'depth', to develop subtlety and complexity.

In regard to the L-M-D design framework and its scope the following was ascertained,

- the framework was most effective when the shading was nuanced within either the greys, browns, or beiges.

- the balance of L-M-D could happen at any point on the scale spectrum of these shades. This however opened up the question of whether an L-M-D framework would work better if the scale were expanded to: LL-L-LM-M-MM-MD-D-DD accounting for the descriptive anomalies of L-L-L, M-M-M or D-D-D.
- an L-M-D framework working across shades and colours introduces a sense of contrast or highlighting dependant on the interpretation of the 2x2 twill.
- where the descriptors 'highlighting', 'contrasting' and 'depth' were used together to describe a sample it denoted a complexity in the rhythm of the L-M-D framework that also engaged with either blending and or shading within the cloth.

These principles suggest that the methods undertaken in this research provide a form of meta-design illustrating the different levels of activity at play with an emphasis on the process rather than the outcomes. Such principles once in work could be ongoing, with designs extracted at opportune times in much the same way as TMA's setting up of their range cloths in proliferation as they sifted for the best results to present to their customers.

The author posits that the research undertaken in its entirety is evocative of TMA's approach and is also an example of meta-design within a cultural design context. The practice-based researcher's role in such a situation is as mediator (McHattie et al, 2017) to professional or public engagement and as collaborator with the local crafting community. The practical outcomes from this research, because they were open-ended and undefined, have gathered a series of building blocks that engages with TK to inform the process of weaving a Shetland tweed. The constructivist system of collecting these aesthetic building blocks prevents assumptions to be made about TK that might veer off its linear trajectory and maintains the level of respect required to handle tacit craft related knowledge embedded in a culture.

7.2 Contribution to knowledge: Studying the TMA archive collection

The aesthetic characteristics laid out as a set of principles to define Shetland tweed in section 7.1.5 are in effect a combination of traditional knowledge and design thinking and these principles not only reflect TMA's design approach but also open up the opportunity to recognise TMA's legacy moving into the 21st century. The manufacturer's process of tweed construction was traditionally Scottish, but the

aesthetic characteristics were true to Shetland. The research puts this tweed in a very different light from how it has been perceived in previous literature.

TMA, set up as a manufacturing concern by the 1920s, developed tweeds that were in the spirit of the woven cloths that had once been produced in the crofting community of the late 1800s and early 1900s. In their range books, particular samples were marked as homespun and hand woven. These characteristics were specified in press releases to their customers in the USA during the 1950s and 1960s. The TMA versions of the natural colours from the Shetland wool were mixtures in the tradition of Scottish tweed spun colours and not natural shades sorted from the fleece, suggesting that the manufacturer was relying on the established reputation of Shetland woollens and their palette of natural shades. The rudimentary tweed patterns of the early 1900s were replaced by the mid-20th century with a subtlety and complexity in use of colour in the tweed pattern constructions that ought not to be either missed or forgotten. What had evolved was an aesthetically, sophisticated cloth appropriate for the demands of the luxury market TMA supplied.

The TMA remit was clear: to sell Scottish tweeds that were distinctly from Shetland, taking full advantage of the Shetland wool natural shades legacy. This key element was juxtaposed by the tried and tested formula of colour and pattern construction already in work across the NASWM. TMA tweeds evoked 'homespun' by maintaining the impression of the natural colour palette and to this degree reflected the Shetlanders' long-standing appreciation for their indigenous wool reaffirming their cultural creative framework.

This description of TMA's approach as a tweed manufacturer suggests that their process of working produced tweeds that exemplified cultural design activity and therefore were not an exemplification of traditional craftsmanship as it might be perceived in ICH. They were in effect safeguarding the indigenous community's knowledge of the design qualities of Shetland wool through the potential of weaving tweed; an example of preserving TK as laid out by Kouhia and Seitammaa-Hakkarainen (2017). This puts the TMA tweed in a category that straddles craft, design and manufacture. There is a definite sense that TMA Shetland tweed of the 1950s and 1960s was an evolutionary example of Shetland's cultural identity making it that much more poignant that their production progressively slowed through the 1970s and 1980s till eventually the manufacturer closed its doors to tweed production in the early 1990s, halting a particular legacy of cultural design thinking.

Today's public and professional engagement with Shetland's textiles, described as a 'maker culture' (Carden, 2018) is increasingly online and global, with Shetland Wool Week becoming a yearly opportunity for specialists and amateurs alike to meet and share their learning and experience. This modern phenomenon of engagement, though significantly beneficial for the sustainability of such a textile craft economy as Shetland, might in the long term change the way in which the aesthetic appeal is perceived and interpreted simply because the phenomenological experience in Shetland, dominated by its northern light, is unique to Shetland and cannot be packaged.

7.3 Limitations of the research

1. The process of coding the tweeds in inquiry 'C Archives TMA' had not been applied to the common twill sample of tweeds in CAT 11, selected for the colour study discussed in chapter 6. In hindsight, it may have been beneficial to this research to apply both methods of analysis to the same study sample however, these methods of working developed separately as the research evolved. Such methods could work well together if a similar study was undertaken.
2. The research only looked at one manufacturer. It would benefit to see how the other manufactures of tweed (of which there were probably only four or five) compared to TMA's design approach. However, to reiterate, archives covering similar bodies of work were currently unknown during the time this research was conducted.
3. A phenomenological position kept the focus of the research within Shetland on TMA's specific activity of developing range cloths to show their clients. However, in light of this research, assessment of this form of design thinking in relation to the colour and fashion trends of the time would start to appreciate TMA's global reach.
4. The description 'subtle' was often used to describe the closer shades working together, however this word did not become a code. Future similar research ought to code this word as a descriptor to counteract the descriptor 'contrast'.

7.4 Future recommendations

7.4.1 In relation to the further research into the TMA archives

1. The colour study, discussed in chapter 6 looked at the common twill range cards over a ten year period. This form of research could continue through the TMA

archives looking at the other pattern groups and their interpretation through colour.

2. The research touched on the possible shared design thinking between tweed and Fair Isle. In light of this research, it would be beneficial to look into this relationship in more depth.
3. The research focused in on TMA's prolific production period between the 1950s and 1960s. A similar focused approach could be taken to study the design of the tweeds produced between the 1920s -1940s and mid 1960s – mid 1980s.
4. The authors approach to visualising the TMA range cards in chapter 6 might extend to other areas of the TMA archive collection like the Fair Isle. This process of visualisation could provide a valuable source to practitioners researching similar archive material for a cultural design context.
5. The research touched on the spinning of the TMA yarn and its varied qualities and mixtures spun in particular by Porteous & Co working in the 1950s and 1960s. In light of this research it may be beneficial to study the spinners' methods to understanding how a fine woollen quality was spun from Shetland wool, and ultimately it might provide the possibility to reproduced TMA's lighter weights for weaving.

7.4.2 In relation to public or professional engagement as a mediator

1. This practice based experiential approach to studying local textiles and their context juxtaposed with a more systematic review of use of colour, reliant on the indigenous wool could be adopted to study other similar textiles categories initially within Scandinavia .
2. Conclusions from this research proposed as a meta-design constructivist framework, could be developed into a series of workshops to facilitate design thinking for practitioners wanting to bring an indigenous cultural design element to their craft.
3. This phenomenological perspective on practice based research combining constructivist grounded theory with constructivism as a process of making could be applied to other cultural contexts where an aesthetic nature to the artefacts is otherwise elusive.

References

Chapter 1 introduction

Appiah, K.A. (2016) 'Mistaken Identities, Creed, Country, Colour, Culture.' Reith Lectures, NYU, NY, available from: BBC Radio 4 – Reith Lectures Podcasts [accessed 23 February 2017]

Archer, B. (1979) 'Whatever Became of Design Methodology', in Cross, N., ed. Development in Design Methodology, Chichester, John Wiley & Sons, 347-349

Broadbent, J. (2003) 'Generations in Design Methodology', The Design Journal, 6 (1), 2-9

Carden, S. (2018) 'Producing and consuming 'maker cultures': Shetland knitting as production, process and product', Making Futures Journal, 5, 1-11

Christie, D.R. (1958) 'Scottish Tweeds: four hundred years in fashion', London, International Wool Secretariat

Christiansen, C. (2010) 'Guide to Shetland Museum Textile Collection', Lerwick, Shetland Amenity Trust

Costin, S.H., ed. (1967) 'Handwoven Tweeds' Style Magazine in Style Weekly, 30 March, No.15

Cross, N. (1982) 'Designerly Ways of Knowing', Design Studies, 3 (4), 221-227

Cross, N. (1990) 'The Nature and Nurture of Design Ability', Design studies, 11 (3), 127-140

Dormer, P. (1994) 'The Art of The Maker', London, Thames and Hudson Ltd

Findeli, A & Bousbaci, R (2005) 'L'Eclipse de l'object dans les theories du project en design', The Design journal, 8 (3), 35-49

Frayling, C. (1993) 'Research in Art and Design 1', Royal College of Art Research Papers, 1 (1) 1-5

Harvey, C. D. (2001) 'Heritage Pasts and Heritages Presents: temporality, meaning and the scope of heritage studies', International Journal of Heritage Studies [online] 7:4, 319-338, available from: DOI:10.1080/13581650120105534 [accessed 16 April 2012].

Ingold, T. (2013) ‘Making’, London, Routledge

Ponting, K. (1987) ‘The Scottish Contribution to Wool Textile Design in the Nineteenth Century’ in Scottish Textile History, ed. Butt, J. & Ponting, K. Aberdeen, Aberdeen University Press

Society of Shetland Crofter weavers Ltd (1946) ‘Rules of the Shetland Crofter weavers Ltd, 25th June 1946’, Shetland Archives D9/446, Shetland Museum and Archives, Archives reading room [retrieved 10th December 2010].

Yee, J.S.R. (2010) ‘Methodological Innovation in Practice-Based Design Doctorates’, Journal of Research Practice [online], 6 (2), Article M15, available from: http://jrp.icaap.org/index.php/jrp/article/view/196/193 [accessed 4th September 2012]

Chapter 2 – Literature review

Abrams, L. (2006) ‘Knitting, Autonomy and Identity: The Role of Hand-knitting in the Construction of Women’s Sense of Self in an Island Community, Shetland, c. 1850-2000’, Textile History, 37 (2), 149-165

Aitken, S. C. (2015) ‘Quelling Imperious Urges: Deep Emotional Mappings and the Ethnopoetics of Space’, in Bodenhamer, J.D., Corrigan, J., Harris, T.M., ed. ‘Deep Maps and Spatial Narratives’, Bloomington, Indiana, Indiana University Press, 102-133

Alexander, C. (1964) ‘Notes on the Synthesis of Form’, Cambridge, Massachusetts, Harvard University Press

Anderson, F. (2017) ‘Tweed’, London, Bloomsbury Academic

Arnold, C. (2010) ‘An Assessment of the Gender Dynamic in Fair Isle (Shetland) Knitwear’, Textile History, 41 (1), 86-98

Bennet, H. (1987) ‘The Shetland Handknitting Industry’, in The Scottish Textile History (ed) Butt, J. & Ponting, K. Aberdeen, Aberdeen University Press

Bodenhamer, J. D. (2015) ‘Narrating Space and Place’, in Bodenhamer, J. D., Corrigan, J., Harris, T.M., ed. ‘Deep Maps and Spatial Narratives’, Bloomington, Indiana, Indiana University Press, 7-27

Bradley A&J, (2013) ‘Keeping sheep’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 29

Brenna, L., Lupo, E., Seassaro, A. and Trocchianesi, R. (2009) 'The Italian Design Research and Practice in Cultural Heritage Exploitation', in Conference Proceedings Cumulus 38 South Hemispheric shift across learning, teaching and research [online], available from: http://hdl.handle.net/11311/565142 [accessed 20/07/15]

Calder, W. (1945) 'Report on the Woollen Industry in the Highlands and Islands', Edinburgh, Scottish Council for Development and Industry

Chapman R. (2013) 'Shetland Lace', in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications

Christiansen C. (2013) 'Shetland Sheep and wool', in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 18-24

Cock-Clausen, I. (1996) 'The Weaving Workshop, "Vaevestuen", the national tradition as a basis for modern weaving', Scandinavian Journal of Design History, 6, 20-42

Cominelli, F., Greffe, X. (2012) 'Intangible Cultural Heritage: safeguarding for creativity', City, Culture and Society, 3, 245-250, available from: DOI: 10.1016/j.ccs.2012.10.003 [accessed 02 April 2015]

Cross, N. (1990) 'The Nature and Nurture of Design Ability', Design studies, 11 (3), 127-140

Cross, N. (1999) 'Design Research: A Disciplined Conversation', Design Issues, 15 (2), 5-10

Davies, K. (2016) 'The Book of Haps', Edinburgh, Katie Davies Designs Ltd

Dearlove, S. (2013) 'Shetland Tweed in the Twentieth Century', in Laurence, S. ed., 'Shetland Textiles 800 BC to the Present', Lerwick, Shetland Heritage Publications, 138-154

Dillon P., Kokko S., (2017) 'Crafting as cultural ecologically located practice: comparative case studies of textile crafts in Cyprus, Estonia and Peru', Craft Research, 8 (2) 193-222 available from DOI: 10.1386/crre.8.2.193_1

Donald, S.B. (1983) 'Economic changes since 1946', in Witherington, D.J., ed., 'Shetland and the Outside World 1469-1969', New York, Oxford University Press, 198-215

Dormer, P. (1994) ‘The Art of The Maker’, London, Thames and Hudson Ltd

Duncan, C. and Dearlove, S. (2013) ‘L.J. Smith’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 152

Ethington P. J., Toyosawa N., ‘Inscribing the past: Depth as Narrative in Historical Spacetime’, in Bodenhamer, J. D., Corrigan, J., Harris, T.M., ed. ‘Deep Maps and Spatial Narratives’, Bloomington, Indiana, Indiana University Press, 72-101

Fryer, L.G. (1995) ‘Knitting by the Fireside and on the Hillside: a History of the Shetland Hand Knitting Industry c. 1600-1950’, Lerwick, Shetland Times Ltd

George, W. (2010) ‘Intangible Cultural Heritage in Rural Communities: issues of ownership, appropriation, commodification and tourism’, in Lire and Amoeda, ed. Constructing Intangible Heritage, Barcelos, Green Lines Institute for Sustainable Development

Giaccardi, E., (2005) ‘Metadesign as an Emergent Design Culture’, Leonardo, 38 (4), 342-349

Grieve, R. ed., (1970) ‘Shetland Woollen Industry, Special Report 4’, Highlands and Islands Development Board

Gulvin, C. (1973) ‘The Tweedmakers, A History of the Scottish Fancy Woollen Industry 1600-1914’, Newton Abbot, David & Charles (Holdings) Ltd

Harrison, E.S., ed. (1956) ‘Scottish Woollens’, Edinburgh, The Scottish Association of Scottish Woollen Manufacturers

Heffer, C. (2018) ‘Reimagining lace: A contemporary response to place and textile making’, Craft Reasearch, 9 (2) 135-147, available from: DOI: 10.1386/crre.9.1.135_7 [accessed September 12th 2018]

Henry Ballantyne & Sons, Limited Walkerburn (1929), London, Biographical Publishing Company

Henry O. (2013) ‘My life in wool’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 26-27

Hobsbawn E. (1983) ‘Inventing Traditions’, in ed. Hobsbawn, E and Ranger, T. ‘The Invention of Tradition’, Cambridge, Cambridge University Press, 1-14

Ingold, T. (2011) ‘The Perception of the Enviroment’, 2nd ed., Abingdon, Routledge

Ingold, T. (2013) ‘Making’, Oxen, Routledge

Irvine, A. (1953) ‘A letter to E.P. Adie from W.J. Manson & Co, Hillswick’, [Dated typescript], D55/4/2/1, Shetland Museum and Archives, Archive reading room

Jamieson & Smith, ‘Knit Real Shetland’, Lerwick, Jamieson & Smith Shetland Wool Brokers, ltd

Jamieson & Smith (s.d) at http://www.shetlandwoolbrokers.co.uk [accessed on October 10th 2016]

Jansen-Verbeke, M. (2010) ‘Mapping Intangible Heritage – an inspired dialogue between the virtual past and the experienced present’, in Lire and Amoeda ed. Constructing Intangible Heritage, Barcelos, Green Lines Institute for Sustainable Development

Jenkinson, D.I. (1959) ‘The Shetland Woollen Industry - an economic geography’, Liverpool, University of Liverpool

Johnson, L. (2001) ‘Inside the Postcard, Working Life at Adie’s Voe’, Lerwick, Shetland Times Ltd

Johnston E. (2013) ‘Spinning and Dying’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 80-86

Jones, J.C. (1979) ‘Designing designing’, in Jones, J.C. ed. Essays in Design, Chichester, John Wiley & Sons Ltd, 125-141

Jones, J.C. (1983) ‘Continuous design and redesign’, in Jones, J.C. ed. Essays in Design, Chichester, John Wiley & Sons Ltd, 191-218

Kirschenblatt-Gimbett, B. (2004) ‘Intangible Heritage as Metacultural Production 1’, Museum International, 221-222, [online] available from: https://pdfs.semanticscholar.org/07f2/68dd9988d8efc7c35a38d4a323537c58cee2.pdf [accessed 18 May 2012]

Kouhia A., Seitamaa-Hakkarainen (2017), ‘Towards design hybridity: Negotiating traditions through contemporary craft making in Finland’, Craft Research 8 (2), 169-192 available from: DOI: 10.1386/crre.8.2.169_1 [accessed 24th February 2019]

Langlands A. (2017) ‘Craeft, how traditional crafts are about more than just making’, London, Faber & Faber

Laurence S. (2013) ‘Textiles in Shetland today’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications

Lupo, E. (2006) ‘PhD research in design driven processes for the valorisation of cultural heritage’, in Design Research Society, International Conference IADE [online], Lisbon available from: http://hdl.handle.net/11311/261084 [accessed 13 May 2012]

Lupo, E. (2007) ‘Intangible Cultural Heritage Valorisation: a new field for design research and practice’, in Emerging Trends in Design Research, International Association of Societies of Design Research [online], available from: https://pdfs.semanticscholar.org/c11e/20b5f414187813f72b5f57729b57df165764.pdf [accessed 18 May 2012]

Lupo, E. (2008) ‘Beyond Localism, Looking for Sustainability. Designing “typical knowledge” active-action”, in Cipolla C., Peruccio PP ed. Changing the Change proceedings 2008 [online], Allemandi, Torino, available from: http://hdl.handle.net/11311/501146 [accessed 1 October 2015]

Lupo, E., Giunta, E., Trocchianesi, R. (2011) ‘Design Research and Cultural Heritage: Activating the Value of Cultural Assets as open-ended Knowledge Systems’, Design Principles and Practice [online] 5 (6) 432-450, available from: http://hdl.handle.net/11311/667774 [accessed 23rd April 2015]

Macgregor, M. (2009) ‘Fair Isle Knitting Patterns, reproducing the known work of Robert Williamson’, Lerwick, The Shetland Times Ltd

Marr, M. and Scott, K. (2012) ‘Shetland Textile Sector: a review’, Shetland Islands Council and Highlands & Islands Enterprise

McCleery, A., McCleery, A., Gunn, L., Hill, D., (2008) ‘Scoping and Mapping Intangible Cultural Heritage in Scotland Final Report’, Museums Gallery Scotland [online], available from: DOI: [accessed 9th April 2015]

McCleery, A., McCleery, A., Gunn, L., Hill, D.(2010) ‘Intangible Cultural Heritage in Scotland: one nation, many cultures’, in: Lire and Amoeda ed., Constructing Intangible Heritage, Barcelos, Green Lines Institute for Sustainable Development

McCrone, D., Morris, A., Kiely, R. (1995) ‘Scotland the Brand, the Making of Scotland Heritage’, Edinburgh, Edinburgh University Press

McGaw J. (2014), ‘Mapping ‘Place’ in Southeast Australia: Crafting a possum skin cloak’,Craft Research, 5 (1), 11-33, available from: DOI:10.1386/crre.5.1.11_1 [accessed 24th February 2019]

McGregor, S. (2003) ‘Traditional Fair Isle Knitting’, New York, Dover Publications Inc.

McHattie, L, Champion, K., Broadley, C. (2017), ‘Materiality Matters: Exploring the use of design tools in innovation workshops with the craft and creative sector in the Northeren Isles of Scotland’, Design for Next, 12th EAD Conference, Sapienza University of Rome, downloaded from Glasgow School of Art library [accessed February 25th 2019]

McHattie, L, Champion, K., Broadley, C. (2018) ‘Craft, textiles and cultural assets in the Northeren Isles: innovation from tradition in the Shetland Islands’, Island Studies Journal, 13 (2), 39-54, DOI: 10.24043/isj.47 [accessed February 25th 2019]

Miller S. (2006) ‘Shetland Hap Shawls, then and now’, Okehampton, Heirloom Knitting

Niedderer K. and Townsend K., (2014) ‘Designing craft research, joining emotion and knowledge’, The Design Journal, 17 (4), 624-647, DOI:10.2752/175630614X 14056185480221

Noble, C. R. (2002) ‘Knitting Fair Isle Mittens and Gloves’, New York, Lark Books

Nugraha, A.(2009) ‘Asian Ways of Creativity, keeping traditions alive’, Asia Design Journal, 4 (4), 190-215

Osborne, B.S. (2010) ‘Epilogue’, in: Lire and Amoeda, ed., Constructing Intangible Heritage, Barcelos, Green Lines Institute for Sustainable Development

Perivoliotis, M. (2005) ‘The Role of Textile History in Design Innovation: A case Study Using Hellenic Textile History’, Textile History, 36 (1), 1-19, available from: DOI: 10.117/174329505x37103 [accessed 10th November 2010]

Polyani, M. (1966) ‘The Tacit Dimension’, London, University of Chicago Press

Ponting, K. (1987) ‘The Scottish Contribution to Wool Textile Design in the Nineteenth Century’ in Scottish Textile History, ed. Butt, J. & Ponting, K. Aberdeen, Aberdeen University Press

Porter, W., (1988) ‘Notes on the inner logic of designing: two thought experiments’, Design studies, 9 (3), 196-180

Postiglione, G., Lupo, E. (2006) ‘Rural Heritage and Sustainable Tourism: the Humac village in Croatia’, in Villas, stately homes and castles–compatible use, valorisation and creative management conference [online], Varazdin, available from: http://www.dvorci.hr/page.aspx [accessed 1 October 2015]

Pye, D. (1968) ‘The nature and art of workmanship’, Cambridge, Cambridge University Press

Raphael, S. (1994) ‘Theatres of memory’, London, Verso

Relph, E. (1976) ‘Place and Placelessness’, London, Sage Publications Ltd

Riccini, R. (1998) ‘History from Things: notes on the history of industrial design’, Design Issues, 14, (3), 43-64

Ridge, M., Lafreniere, D., Nesbit, S. (2013) ‘Creating Deep Maps and Spatial Narratives Through Design’, International Journal of Humanities and Arts Computing [online], 7 (1-2), 176-189, available from: DOI:10.3366/ijhac.2013.0088 [accessed 13th February 2017]

Robertson, M., and Tulloch, R. (2013) ‘John Tulloch’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 153

Russo S. (2013) ‘Colourings and markings of Shetland sheep’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 31-33

Schön, D. A., (1984) ‘Problems, frames and perspectives on designing’, Design Studies, 5 (3), 132-136

Schön, D. A. (1987) ‘Educating the Reflective Practitioner’, London, Jossey-Bass Publishers

Schön, D. A. (1988) ‘Designing: Rules, types and worlds’, Design Studies, 9, (3), 118-190

Schön, D. A. (1992) ‘Designing as Reflective Conversation with the Materials of a Design Situation’, Research in Engineering Design, 3, 131-147

Sennett, R. (2008) ‘The Craftsman’, London, Penguin Books Ltd

Sinclair A. (2011) ‘No Boundaries’, in I Vesterveg – A collaboration between artists and museums in Shetland, Faroe Islands, Denmark, Iceland and Norway- Shetland Museum and Archives 27/11/2010-03/01/2011

Smith, M., Bunyan, K. (1991) ‘A Shetland Knitter’s Notebook’, Lerwick, Shetland Times Ltd

Smith, M., Twatt, M. (1979) ‘A Shetland Pattern Book’, Lerwick, The Shetland Times Ltd

Smith, P. (1958) ‘Shetland Sheep and Shetland Woollen Industries, Part 1’, Wool Knowledge, winter, 13-17

Smith, P. (1959) ‘Shetland Sheep and Shetland Woollen Industries, Part 2’, Wool Knowledge, spring, 15-18

Starmore, A. (2009) ‘Alice Starmore’s Book of Fair Isle Knitting’, New York, Dover Publications Inc.

Stewart, D. and Mickunas, A. (1974) ‘Exploring Phenomenology’, Chicago, American Library Association

Stillie, T.A. (1970) ‘The evolution of pattern design in the Scottish Woollen Textile Industry in the Nineteenth Century’, Textile History 3, 3, 309-31

Sturt G. (1923) ‘The Wheelwright’s Shop’, Cambridge, Cambridge University Press

Sutherland L. (1984) ‘Observing Shetland sheep’, in Laurence, S. ed., 2013 Shetland Textiles 800 BC to the Present, Lerwick, Shetland Heritage Publications, 28

Trevor-Roper (1983) ‘The invention of Tradition: The highland tradition of Scotland’ in ed. Hobsbawn, E and Ranger, T. (1983) ‘The Invention of Tradition’, Cambridge, Cambridge University Press

Tuan Y. (1975) 'Place: An Experiential Perspective', Geographical Review, 65 (2), 151-165

Tuan, Y. (1990) 'Topophilia', New York, Columbia University Press

UNESCO (2003) 'Convention for the safeguarding of the intangible cultural heritage', Paris, available http://unesdoc.unesco.org/images/0013/001325/132540e.pdf [accessed 6th September 2012]

Unknown (a) (circa 1930s), 'Homespun tweeds, Homespuns from the third category of tweeds', [typescript] D/55/4, Shetland Museum and Archives, Archive reading room

Unknown (b), (1960) 'Boom in Shetland', Daily News Record, March 21st, section 1

Unknown (c), (1963), 'It's the real thing…' Daily News Record, December 6th, 1

Unknown (d). (1966) 'Neckwear opens fashion doors', Daily News Record, June 14th, 18

Vagle, M. D. (2014) 'Crafting Phenomenological Research', Walnut Creek, California Left Coast Press Inc.

Valsecchi, F., Pollastri, S., Yongqi, L.(2012) ' Bamboo Entwines: a design intervention to envision culture and innovation values of local crafts', Researchgate [online] available from: http://www.researchgate.net/publication/261726096 [accessed 01 October 2015]

Van Manen, M. (2007) 'Phenomenology of Practice', Phenomenology & Practice, [online] 1 (1), 11-30, available from: http://www.maxvanmanen.com/phenomenology-of-practice [accessed 27 June 2017]

Vial, S. (2015) 'The effect of design, a phenomenological contribution to the quiddity of design presented in geometrical order', Artefact, 3, (4), 4.1-4.6

Watson, W. (1954) 'Textile Design and Colour', 6th ed., London, Longmans, Green and co Ltd

Wilcox, J. (1984) 'The Shetland Knitwear Industry: development through the 80's', Shetlands, Shetlands Island Council

Winterbotham, H. (1955) 'Report on the Woollen Industry of Shetland', Edinburgh, Scottish Council for Development and Industry

Woods, K.S. (1953) ‘A study of the Wool-Growing and Hosiery Industry’ Oxford, Agricultural Economics Research Institute, [Dated typescript] D/55/4, Shetland Museum Archives, Archive Room

Chapter 3 - methodology, research structure and methods

Brunell, K. (2000) ‘Designing through Making’, The Design Journal, 3 (3), 1-3

Charmaz, K. (2006) ‘Constructing Grounded Theory’, London, Sage Publications Ltd

Cohen, L., Manion L., and Morrison, K. (2011) ‘Research Methods in Education’ 7th ed., Abingdon, Routledge, Taylor & Francis Group

Dearlove, S. (2013) ‘‘Shetland Tweed in the Twentieth Century’, in Laurence, S. ed., ‘Shetland Textiles 800 BC to the Present’, Lerwick, Shetland Heritage Publications, 138-154

Dormer, P. (1994) ‘The Art of The Maker’, London, Thames and Hudson Ltd

Gibson, G., Hartman, J. (2014) ‘Rediscovering Grounded Theory’, London, Sage Publications Ltd

Glaser B.G., Strauss, A.L. (1967) ‘The Discovery of Grounded Theory’, New York, Aldine Publishing Company

Gray, C. and Malins, J. (2004) ‘Visualizing Research, a guide to the research process in art and design’, Farnham, Ashgate Publishing Ltd

Guillemin, M. (2004) ‘Understanding illness: Using drawings as a research method’, Qualitative health research, 14(2), 272-289

Gunn, W., ed. (2009) ‘Fieldnotes and Sketchbooks’, Frankfurt am Main, Peter Lang GmbH

Harrison, A. (1978) ‘Making and Thinking, a study of intelligent activities’, Hassocks, Sussex, The Harvester Press Limited

Harrison, E.S., ed. (1956) ‘Scottish Woollens’, Edinburgh, The Scottish Association of Scottish Woollen Manufacturers

Henry, O. (2013) ‘My life in wool’, in Laurence, S. ed., ‘Shetland Textiles 800 BC to the Present’, Lerwick, Shetland Heritage Publications, 26-27

Ingold, T. (2007) ‘Lines, a brief history’, Oxen, Routledge

Jamieson & Smith (s.d) at http://www.shetlandwoolbrokers.co.uk/about [accessed on 20/09/17]

Keller, A. I., Pasman, G. J., Stappers, P. J. (2006) ‘Collections Designers Keep: collecting visual material for inspiration and reference’, Co-Design in design and the arts, 2, (1), 17-33

Kirschenblatt-Gimbett, B. (2004) ‘Intangible Heritage as Metacultural Production 1’, Museum International, 221-222, [online] available from: https://pdfs.semanticscholar.org/07f2/68dd9988d8efc7c35a38d4a323537c58cee2.pdf [accessed 18 May 2012]

Loh, P., Burry, J., Wagenfeld, M. (2016) ‘Reconsidering Pye’s theory of making through digital craft practice: A theoretical framework towards continuous designing’, Craft Research, 7, (2), 187-206

Magee, K., and Waters, S. (2011) ‘Archives, Artists and Designers’, Journal of the Society of Archivists, [online] 32 (2), 273-285, available from: DOI:10.1080/00379816.2011.619707 [accessed 16th March 2015]

Martin (1964) ‘Construction from within’, in Bann, S., ed. (1974) ‘The Documents of Twentieth Century Art, The Tradition of Constructivism’, London, Thames and Hudson

McGregor S. (2003) ‘Traditional Fair Isle Knitting’, New York, Dover Publications Inc

Miles, B., Huberman, A. M., Saldana, J. (2014) ‘Qualitative Data Analysis’ 3rd ed., London, Sage Publications Ltd

Myers, D. M., Newman, M. (2007) ‘The qualitative Interview in IS research: examining the craft’, Information and Organisation, 17, 2-26

Newbury, D. (1996) ‘Diaries and Fieldnotes in the Research Process’, Research Issues in Art, Design and Media, Research Training Initiative, 1, 1-17

Purcell, A.T., Gero, S. J. (1998) ‘Drawings and the Design Process’, Design Studies, 19, 389-430

Rose, G. (2010) ‘Visual Methodologies, an introduction to the interpretation of visual material’, 2nd ed., London, Sage Publications Ltd

Saldana, J. (2009) ‘The Coding Manual for Qualitative Researchers’, London, Sage Publications Ltd

Schenk, P. (2011) ‘A Review of Differences and Similarities in the Drawing Practice of Graphic and Textile designers’, in Diversity and Unity: Proceedings of IASD, the 4th World Conference on Design Research

Schenk, P. (2014) ‘Inspiration and Ideation: drawing in a digital age’, Design Issues, 30 (2), 42-55

Schön, D.A. (1983) ‘The Reflective Practitioner, How Professionals Think in Action’, Aldershot, Ashgate Publishing Ltd

Schön, D. A. (1988) ‘Editorial’, Design Studies, 9 (3), 130-132

Schön, D.A. (1988) ‘Designing: Rules, types and worlds’, Design Studies, 9, (3), 118-190

Seitamaa-Hakkarainen, P. and Hakkarainen, K. (2000) ‘Visualization and Sketching in the Design Process’, The Design Journal, 3 (1), 3-14

Sheehan, D., Tebby, S. (2003) ‘Ann Sutton’, London, The Crafts Council in association with Lund Humphries

Smith, M., Bunyan, K. (1991) ‘A Shetland Knitter’s Notebook’, Lerwick, Shetland Times Ltd

Starmore, A. (2009) ‘Alice Starmore’s Book of Fair Isle Knitting’, New York, Dover Publications Inc.

Taylor, B. (2014) ‘After Constructivism’, London, Yale University Press

Verstijnen, I.M., Hennessey, J.M., Leeuwen, C.V., Hamel, R., Goldshimdt, G. (1998) ‘Sketching and Creative Discovery’, Design Studies, 19 (4).

Watson, W. (1954) ‘Textile Design and Colour’, sixth ed., London, Longmans, Green and co Ltd.

Chapter 4 – exploritory inquiries

Simmons, J. (1985) ‘Shetland Dye Book’, Lerwick, Shetland Times Ltd

Chapter 6 – inquiry 'C archives TMA' use of colour: 1957-1967

Christiansen, C. (2019) [conversation about TMA's Shetland shade mixtures and their particular spectrum of nine shades]

Shetland Flock Book Society (1927) 'Bye-Laws and Regulations', SA4/3000/17/38/1, Shetland Museum and Archives, Archives reading room [retrieved 10th October 2019].

T.M. Adie & Sons (1958) '27th December '58 Yarn_Blends James Porteus and Co, Ltd, Alva,' D55/4, Shetland Museum and Archives, Archives reading room [retrieved 12th July 2011].

T.M. Adie & Sons (circa 1974), Tweed, production, sales and expenses 1949-1972, Shetland Archives D55/4, Shetland Museum and Archives, Archives reading room [retrieved 21st June 2011]

Chapter 7 – Conclusions and future work

Carden, S. (2018) 'Producing and consuming 'maker cultures': Shetland knitting as production, process and product', Making Futures Journal, 5, 1-11

Hill, A. (1959) 'On Construction, Nature and Structure', in Bann, S., ed. (1974) 'The Documents of Twentieth Century Art, The Tradition of Constructivism', London, Thames and Hudson

Kouhia A., Seitamaa-Hakkarainen (2017), 'Towards design hybridity: Negotiating traditions through contemporary craft making in Finland', Craft Research 8 (2), 169-192 available from: DOI: 10.1386/crre.8.2.169_1 [accessed 24th February 2019]

McHattie, L, Champion, K., Broadley, C. (2018) 'Craft, textiles and cultural assets in the Northeren Isles: innovation from tradition in the Shetland Islands', Island Studies Journal, 13 (2), 39-54, DOI: 10.24043/isj.47 [accessed February 25th 2019]

Figure and Table References

Chapter 3

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Figure 3.16 Dearlove, S. (2011) '*examples of blending in TMA Fair Isle swatches, 1930s – 60s',* [photographs] in possession of: the author, SM store: [accessed 6th April 2011] Tex. 1994.255

Figure 3.17 Dearlove, S. (2011) '*examples of blending within a warp and weft in TMA range cloths'* [photographs] in possession of: the author, (a-c) SM store [accessed 6th April 2011], (a) Tex. 1993.198: range 54, (b) Tex. 1993.198: range 32, (c) Tex. 1992.545/6: range 3127-A1

Figure 3.18 Dearlove, S. (2011) *'examples of TMA cloths testing different dyed colour gradations',* [photographs] in possession of: the author, SM store: [accessed 6th April 2011] Tex.1993.198: ranges 50-54

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Figure 3.24 Dearlove. S (2015) '*TMA shades and mixtures'* [photograph] in possession of: the author, SM store: [accessed 16th September 2015] Tex. 1992.508

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Bibliography

Abrams, L. (2010) 'Myth and Materiality in a Women's World, Shetland 1800-2000', Manchester, Manchester University Press

Adamson, G., ed. (2010) 'The Craft Reader', London, Berg Publishers plc

Ahmad, Y. (2006) 'The Scope and Definitions of Heritage: from Tangible to Intangible,' International Journal of Heritage Studies [online], 12 (3), 292-300, available from: DOI: 10.1080/13527250600604639 [accessed 16 April 2012]

Albers, A. (1965) 'On Weaving', London, Studio Vista Publishers

Albers, A. (2000) 'Selected Writings on Design', New England, Wesleyan University Press

Adalsteinsson, S. (2000) '1000 Years of Sheep in Shetland', in Shetland Sheep 2000 Conference, available from: http://www.sheep-isle.dk/faroe/faroeshetland.htm [accessed 7 December 2011]

Alvesson, M., Skoldberg, K. (2009) 'Reflexive Methodology, New Vistas for Qualitative Research', 2nd ed., London, Sage Publications Ltd

Aoalsteinsdottir, M., ed. (2010) 'I Vesterveg, a collaboration between artists and museums in Shetland, Faroe Islands, Denmark, Iceland and Norway', Lerwick, Shetland Museum & Archives, and Shetland Arts Development Agency.

Archer, B. (1979) 'Whatever Became of Design Methodology', in Cross, N., ed. Development in Design Methodology, Chichester, John Wiley & Sons, 347-349

Aspin, C. (2006) 'The Woollen Industry', 2nd ed., Princes Risborough, Shire Publications Ltd

Bann, S., ed. (1974) 'The Documents of Twentieth Century Art, The Tradition of Constructivism', London, Thames and Hudson

Bettiol, M. and Micelli, S. (2014) 'The Hidden Side of Design: The Relevance of Artisanship', Design Issues, 30, (1), 7-18

Blossom, E. (2011) 'Material Thinking and the Social Entrepreneurship Movement', New York, Metropolis Books

Bousbaci, R. (2008) '"Models of Man" in Design Thinking: The "Bounded Rationality" Episode', Design Issues: 24 (4), 38-52

Breakell, S., Worsley, V. (2007) 'Collecting the Traces: an archivist's perspective', Journal of Visual Art Practice, [online], 6 (3), 175-189, available from: DOI: 10.1386/jvap.6.3.175.1 [accessed 23/04/15]

Britton, A. (2013) 'Seeing Things, Collected Writings on Art, Craft and Design', London, Occasional Papers

Brown, C. (2003) 'A stitch in Time, Unst Fine Lace knitting', Haroldswick, Unst Heritage Trust

Brown, M. F. (2005) 'Heritage Trouble: Recent Work on the Protection of Intangible Cultural Property', International Journal of Cultural Property [online], 12, 40-61, available from: DOI: 10.1017/S0940739105050010 [accessed 23 February 2017]

Buchanan, R (1992) 'Wicked problems in Design Thinking', Design Issues, 8 (2), 5-21

Buchanan, R. (2001) 'Design Research and the New Learning', Design Issues, 17 (4), 3-23

Bye, E. (2010) 'A Direction for Clothing and Textile Design Research', Clothing and Textile Research Journal [online], 28 (3), 205-217, available from: DOI:10.1177/0887302x10371505 [accessed 7 December 2010]

Carden, S. (2019) 'The Place of Shetland Knitting', Textile, cloth and clothing, 17 (4), 357-367, DOI:10.1080/14759756.2019.1639416 [accessed September 20th, 2019]

Carman, J. (2010) 'Monuments of Light and Air: the Intangible of the Tangible', in Lire and Amoeda, ed. Constructing Intangible Heritage, Barcelos, Green Lines Institute for Sustainable Development,

Christiansen, C., ed. (2010) 'Guide to Shetland Museum Textile Collection', Lerwick, Shetland Amenity Trust

Christie, D.R. (1958) 'Scottish Tweeds: four hundred years in fashion', London, International Wool Secretariat

Corbin, J., Strauss, A., (2008) 'Basics of Qualitative Research', 3rd ed., London, Sage Publications Ltd

Creswell, J. W. (2003) ‘Research Design, Qualitative, Quantitative, and Mixed Methods Approaches’, London, Sage Publications Ltd

Cross, N., ed. (1984) ‘Developments in Design Methodology’, Chichester, John Wiley & Sons

Csikszentmihalyi, M. (1994) ‘The Evolving Self’, New York, Harper Perennial

Cumming, E. (2004) ‘Scottish Everyday Art, or How Tradition Shaped Modernism’, Journal of the Scottish Society for Art History, 9, 55-62

Denzin, N.K., Lincoln, Y. S., ed. (2011) ‘The Sage Handbook of Qualitative Research 4’, London, Sage Publications Ltd

Dixon, A. (2007) ‘Handweaver’s Pattern Book’, London, A&C Black Publishers

Dormer, P. (1990) ‘The Meaning of Modern Design, Towards the Twenty-first Century’, London, Thames and Hudson Ltd

Dormer, P., ed. (1997) ‘The Culture of Craft’, Manchester, Manchester University Press

Dormer, P. (1997) ‘Textile and Technology’, in Dormer, P., ed. The Culture of Craft, Manchester, Manchester University Press, 168-175

Dormer, P. (1997) ‘The Language and Practical Philosophy of Craft’, in Dormer, P., ed. The Culture of Craft, Manchester, Manchester University Press, 219-230

Eckert, C. (2000) ‘Sources of Inspiration: a Language of design’, Design Studies, 21 523-538

Edson, G. (2004) ‘Heritage: Pride or Passion, Product or Service?’, International Journal of Heritage Studies [online], 10, (4), 333-348, available from: DOI: 10.1080/1352725042000257366 [accessed 16 April 2012]

Emerson, R.M., Fretz, R.I., Shaw, L.L. (1995) ‘Writing Ethnographic Fieldnotes’, London, University of Chicago Press, Ltd.

Fall, J.J. and Minca, C. (2013) ‘Not a geography of what doesn’t exist, but a counter-geography of what does. Rereading Giuseppe Dematteis’ Le Metafore della Terra’, Progress in Human Geography [online] 37 (4) 542-563, available from: DOI: 10.1177/0309132512463622 [accessed 01/10/15]

Fallan, K. (2008) ‘De-scribing design: appropriating script analysis to design history’, Design Issues, 24, (4), 61-75

Fallman, D. (2008) ‘The Interaction Design Research Triangle of Design Practice, Design Studies, and Design Exploration’, Design Issues, 24 (3), 4-18

Farrell Krell, D, ed. (1993) ‘Basic Writings 1927-1964, Martin Heidegger’, London, Routledge

Foster, H. (2004) ‘An Archival Impulse’, October 110, [online] Fall, 3-22, available from: DOI :10.1162/0162287042379847 [accessed 24/04/15]

Fryer, L.G. (1992) ‘The Shetland Handknitting Industry 1790-1950 with special reference to Shetland Lace’, Glasgow, University of Glasgow,

Giaccardi, E. and Fischer, G., (2008) ‘Creativity and Evolution: a Metadesign Perspective’, Digital Creativity [online], 19 (1), 19-32, available from: DOI: 10.1080/14626260701847456, [accessed

Grant, I.F. (1995) ‘Highland Folk Ways’, 2nd ed., Edinburgh, Birlinn Ltd

Guba, E.G. and Lincoln, Y.S. (1994) ‘Competing Paradigms in Qualitative Research’, in Guba, E.G. and Lincoln, Y.S. ed. Handbook of qualitative research, 2 (163-194), 105-117

Gunn, W., Otto, T., Smith, R. C. (2013) ‘Design Anthropology’, London, Bloomsbury Academic

Hakonaedottir, H., Johnston, E., Juuhl, M. K. (2016), ‘The warp weighted loom’, Hordaland, Skald Forlag

Harrison, E.S. (1968) ‘Our Scottish District Checks’, Edinburgh, The National Association of Scottish Woollen manufacturers

Heat-Moon, W.L. (1999) ‘Prairie Earth: (a deep map)’, Mariner Books

Hemmings, J. (2010) ‘In the Loop, Knitting Now’, London, Black Dog Publishing

Hemmings, J., ed. (2012) ‘The Textile Reader’, London, Berg Publishers plc

Hobsbawn, E and Ranger, T. (1983) ‘The Invention of Tradition’, Cambridge, Cambridge University Press

Howe, T. and Dillon, P. (2001) 'Cultural Niche and the context of craft, design and fine art', The Design Journal, 4, (3), 50-57

Kalviainen, M. (1998) 'The Professionally Accepted Good Product', The Design Journal, 1 (3), 30-43

Kalviainen, M. (2000) 'The Significance of 'Craft' Qualities in Creating Experiential Design Products', The Design Journal, 3, (3), 4-15

Keller, A. I., Visser, F. S., Lugt, R., Stappers P.J., (2009) 'Collecting with Cabinet: or how designers organise visual material, researched through an experimental prototype', Design Studies, 30, 69-86

Ketelaar, E. (2001) 'Tacit Narratives: the meaning of archives', Archival Science, [on line] 1, 131-141, [accessed 23 April 2015]

Laurence, S. ed, (2011) 'Knit Real Shetland, 15 knitting projects in Real Shetland Wool from Jamieson & Smith', Lerwick, Jamieson & Smith Shetland Wool Brokers Ltd

Lire, S. and Amoeda, R., ed. (2010) 'Constructing Intangible Heritage', Barcelos, Green Lines Institute for Sustainable Development

Louridas, P. (1999) 'Design as Bricolage: anthropology meets design thinking', Design Studies, 20 517-535

Lupo, E. (2009) 'Chinese paper offerings active-action by design', in Sharing Culture, International conference on intangible heritage proceedings [online], 2009, available from: http://hdl.handle.net/11311/563839 [accessed 18 May 2013]

Lupo, E. (2010) 'Beyond Craft Culture: designing a new contemporary "authentic", in Design & Craft Conference proceedings [online], Bruxelles, available from: http://hdl.handle.net/11311/583076 [accessed 20 July 2015]

Lupo, E. and Valsecchi, F. (2010) 'Designing Local Cultures Evolution and Socialisation, within the Global Knowledge', in Young Creators for Better City and Better Life Conference proceedings [online], Cumulus 2010, available from http://www.researchgate.net/publications/261726557 [accessed 14 July 2015]

Maguire, P. (1991) 'Designs on Reconstruction: British Business, Market Structures and the Role of Design in Post-War Recovery', Journal of Design History, [online] 4, (1), 15-30, available from jdh.oxfordjournals.org, [accessed 22 March 2011]

Makovicky, N. (2009) '"Traditional with Contemporary Form": craft and discourses of modernity in Slovakia today', The Journal of Modern Craft, 2 (1), 43-58

Martindale, J.G. (1954) 'The Scottish Woollen Industry', London, International Wool Secretariat

Mathias, E., Mundy, P., (2018) 'Shetland's Sheep', Lerwick, Anderson & Co

McCleery, A., McCleery, A., Gunn, L., Hill, D., (2009) 'Defining and Mapping Intangible Cultural Heritage', IFACCA, [online] d'art report No. 36, [accessed 9th April 2015]

McHattie, L., Champion, K., Johnson, M., (2019) 'Crafting the local: the lived experience of craft production in the Northern Isles of Scotland', Cultural Trends, 28 (4), 305-316, DOI: 10.1080/09548963.2019.1644791 [accessed September 20th 2019]

Newbury, D. (1996) 'Knowledge and Research in Art and Design', Design studies, 17, 215-219

Nimkulrat, N. (2007) 'The Role of Documentation in Practice-Led Research', Journal of Research Practice [online] 3 (1) [accessed 11/02/15]

Press, M., Cusworth, A. (1997) 'A New Vision in the Making: exploring the value of craft education in the information age;, The Design Journal, 0 (1), 12-29

Pye, D. (1978), 'The Nature and Aesthetics of Design', London, Barrie and Jenkins Ltd

Read, H. (1945) 'Education Through Art', London, Faber and Faber

Rees, H. (1997) 'Patterns of Making: thinking and making in industrial design', in Dormer, P., ed., The Culture of Craft, Manchester, Manchester University Press, 116-136

Riccini, R. (2001) 'Innovation as a Field of Historical Knowledge for Industrial Design', Design Issues, 17 (4), 24-31

Robinson, E. (2007) 'Documentation and Monitoring of Intangible Cultural Heritage a 21st Century Approach', in XX1 International CIPA Symposium [online], available from: pdfs.semanticscholar.org/eebb/bd80aa5f009885344c0bf8e8690bbb1031ff.pdf [accessed 23 February 2017]

Rotzler, W. (1979) ‘Aspects of Constructive Art’, in Spalding, K.L., ed., Constructivism and the Geometric Tradition: selections from the McCrory corporation collection’, New York, Albright-Knox Art Gallery

Schon, D. A. (1984) ‘Editorial’, Design Studies, 5 (3), 130

Schon, D. A. (1984) ‘Problems, frames and perspectives on designing’, Design Studies, 5 (3), 132-136

Sedita, S.R. (2012) ‘Leveraging the Intangible Cultural Heritage: novelty and innovation through exaptation’, City, Culture and Society, 3, 251-259

Silverman, D. (2007) ‘Qualitative Research’, London, Sage Publications Ltd

Simpson, L., Weir, M. (1978) ‘The Weaver’s Craft’, 13th ed., Northgate, The Dryad Press.

Singh, J.P., Sever, N. (2009) ‘Measurement and Definitions of Intangible Cultural Heritage: Recommendations from the existing literature’, Washington, Georgetown University

Steedman, C. (1998) ‘The Space of Memory: in an archive’, History of the Human Sciences [online] 11, (4), 65-83, available from: hhs.sagepub.com [accessed 24/04/15]

Sterry, M. P. (1994), ‘An analysis of heritage centres with special reference to the role of design’, [PhD thesis] Manchester Metropolitan University

Stewart, K. (1996) ‘Crofts and Crofting’, 3rd ed. Edinburgh, Mercat Press

Strickfaden, M., Rodgers, P. (2004) ‘Scripting - Personal Narratives in the Designing of Artefacts’, The Design Journal, 7 (1), 3-15

Studd, R. (2002) ‘The Textile Design Process’, The Design Journal, 5 (1), 35-49

Trantum, A.M. (1978) ‘The Woollen Industry of Shetland Isles’, Colchester, Colchester Institute of Higher Education

Tuan, Y. (1975) ‘Space and Place, a Humanistic Perspective’, Progress in Geography, 6 (1), 211-252

Turner, W.H.K. (1964) ‘Wool Textile Manufacture in Scotland’, Scottish Geographical Magazine [online] 80 (2), 81-89, DOI: 10.1080/00369226408735928, [accessed 20 June 2012]

Vagle, M. D. (2010) ‘Re-framing Schon’s call for a phenomenology of practice: a post-intentional approach’, Reflective Practice [online], 11, (3), 393-407, available from: DOI: 10.1080/14623943.2010.487375 [accessed 27 June 2017]

Vecco, M. (2010) ‘A Definition of Cultural Heritage: from the tangible to the intangible’, Journal of Cultural Heritage, 11, 321-324

Velios, A. (2011) ‘Creating Archiving: a case study from the John Latham archive’, Journal of the Society of Archivists [online], 32 (2), 255-271, available from: DOI: 10.1080/00379816.2111.619705 [accessed 16/03/15]

Waters, S. (2015) ‘The Glasgow Miracle Project: working with an arts organisation’s archives’, Archives and Records: The Journal of the Archives and Records Association [online], 1-12, available from: DOI: 10.1080/23257962.2015.1010150 [accessed 16/03/15]

Willis, A. (2019), ‘The Design Philosophy Reader’, London, Bloomsbury Publishing Plc

Yair, K., Tomes, A., Press, M. (1999) ‘Design Through Making: crafts knowledge as facilitator to collaborative new product development’, Design Studies, 20, 495-515

Yair, K., Tomes, A., Press, M. (2001) ‘Crafting Competitive Advantage: crafts knowledge as a strategic resource’, Design Studies, 22, 377-394

Yin, R. K. (2009) ‘Case Study Research, Design and Methods’, 4th ed., London, Sage Ltd

Appendix A

Shetland Tweed Industry (Final draft 18/05/13)

Tweed made in Shetland, in 100% Shetland wool, is a scarce commodity today. Few examples of it can be found in retail shops or online. There is only one small scale manufacturer of tweed left in Shetland which sells to an exclusive market in the U.K. and abroad. The most recent commercial exposure of Shetland tweed was a tailored sports jacket featured in the current B.B.C. Doctor Who drama, series six. The cloth was purchased from renowned wholesaler W. Bill Ltd, specializing in all types of tweed fabric.[1] W. Bill Ltd, which started as a family-run business in 1846, is probably one of the last wholesalers still to have bolts of Shetland tweed dating back to the mid-20th century.[2]

The manufacture of Shetland tweed grew out of the crofting tradition of making cloth known as claith to trade for goods and essentials. Around the beginning of the 20th century this cottage industry began to develop. Landlord merchants, who stocked the claith in their local community shops, set up small manufacturing systems in response to an evolving international market for textile goods.[3] Production became centralised. This enabled collections of basic tweed fabric to be developed and orders accepted and processed. The orders were hand woven by the crofters using yarn spun by hand from wool from the Shetland sheep. The fabrics were bought by wholesalers dealing in tweed for the fashion and tailoring market. These Shetland tweeds became part of a family of hand woven tweeds which were from across the Highland and Islands of Scotland known as 'homespuns'.[4]

The most renowned of the 'homespun' to this day is Harris tweed which is made in the Outer Hebrides. Its qualities have differed greatly from those of Shetland tweed. It has had a coarser heavier handle, whereas Shetland tweed is generally a lighter, softer cloth. Consequently, each of these tweeds found their niche in very different markets. Harris tweed has always had a strong position in the UK whereas Shetland tweed found its main market abroad. These are just a few of the examples that differentiate these two homespun industries. In order to appreciate the Shetland tweed story however, it is interesting to consider the success story that is the Harris tweed industry, which has spanned the last 167 years.

The Harris tweed industries developed out of a local crofting concern when Lady Dunmore, in 1846, took it upon herself to market and sell the crofters' cloth.[5] The wool used to make Harris tweed comes from Black face, cross bred and Cheviot sheep. The tweed is best known for its depth and variety of colour. This is achieved first by dyeing the wool. The different coloured batches are then blended to specific colour recipes. This melange of coloured wool is then spun for weaving.[6] These yarns arranged both in the warp and weft add a further dimension of texture and colour to a classic tweed pattern. As early as 1910 the Harris Tweed Orb certification trademark was established. It defined the essential characteristics of the tweed as follows: the wool must be 100% pure new wool and it must be spun, hand-woven and finished in the Outer Hebrides.[7]

There was no stipulation to the origin of the wool or its quality. This meant therefore that the wool could be sourced from outside the Islands and the quality could be adapted to the needs of the changing market. Thus, in the 1990s the industry modernised itself, developing the Harris cloth further to be woven wider, softer and lighter. At this time the Harris Tweed Authority was established by act of Parliament 1993, which has set in stone the origination of this tweed.[8]

Each length of hand-woven cloth goes through a rigorous inspection before receiving the famous trademark stamp. The underlying factors in Harris tweed's success are that production remains under the strict control of the Islanders and that the trade mark protects the Islanders' manufacturing process.[9]

Shetland tweed, on the other hand, is inextricably linked to the qualities of its raw material: the wool from Shetland sheep. This wool is unique in the Scottish woollen industry and synonymous with the Shetlands. It is at the heart of Shetland tweed's complex history, which is inextricably linked with social and industrial upheaval.

Throughout the 20th century the challenge for Shetland producers and makers was to reveal the inherent qualities of pure Shetland wool. It is naturally light, soft, warm and strong with a silk-like sheen. A pure bred Shetland sheep produces a fleece providing only '1 ¾ pounds of greasy wool on average compared with 5 - 6 pounds average from a Cheviot or Blackface.'[10] The fleece is better known for the fine wool used in Shetland knitwear; however, the coarser parts of it were used for spinning the yarn needed for tweed. This yarn was strong and durable but still lighter and softer than yarns used in other Scottish tweeds. The limited production of Shetland wool along with its unique properties made it a premium raw material. This gave Shetland woollen products, made in Shetland, a place in the international luxury market. The exclusivity of the word 'Shetland' came at a cost. There were woollens made with a poor or mixed quality Shetland wool but sold as a premium Shetland product. This inevitably affected customers' appreciation for this luxury commodity.[11] One of the problems was that the geographical place bore the same name as the breed of sheep. In 1952 the Retail Trading Standards Association defined Shetland as follows, 'This term indicates that the article has been made from the fine wool of Shetland sheep, but not necessarily manufactured in the Shetland Isles'.[12] Efforts were made to have this reviewed through a committee set up by the Shetland county council called the Trade Names Committee. The final decision was given to the advisory panel for the Highlands and Islands, which decided that changing the terminology of the word Shetland was at that time too controversial.[13] This complication in the terminology of the word 'Shetland' and in its use in the woollen industry in general has been the Islands' Achilles' heel ever since. However, the Shetland woollen Industry did not give in too easily as efforts were made to try and protect it.

In 1921 the Shetland Woollen Industry Association Ltd (SWIA) was established, with a membership of over 3000 across the Islands involved in the trade.[14] The main objective was to create a trademark for all woollen goods; there was a need to unify a rapidly developing industry in order to maintain the integrity of Shetland wool and the craftsmanship of the Islands. In 1922 the SWIA was successful in gaining certification

from the Board of Trade for their trademark, which was known as the Galley Mark. However, this Galley Mark was short lived as there was disagreement within the SWIA as to the charge levied on individual makers for using it, criteria for quality control and the logistics of inspecting all the woollen products being made on the Islands. By the 1930s the SWIA had wound down its activities.[15]

Towards the end of WW2, a trade report commissioned by the Scottish Council on Industry was conducted to focus post war efforts on regenerating the Shetland woollen industry. It became known as the Calder Report, after the secretary William Calder, and was published in 1945. It stated that Shetlanders needed:

'(1) to secure an adequate permanent supply of pure Shetland wool; (2) to have their wool graded and spun into suitable yarns; (3) to allocate the yarn to the different types of manufacture; (4) to dispose of any surplus wool to the best advantage of producers; (5) to achieve a uniformly higher standard of quality in the woollen goods produced and to encourage new industries; (6) to advertise their woollen goods.'[16]

As a result, one of its key recommendations was to inspire the Shetlanders to take control of their raw material in a more unified manner. Therefore, the creation of a new organisation called the Shetland Association was proposed. The Association would purchase Shetland wool outright, grade and allocate it to various users and pay the producers. The suggestion was pursued amongst members of the S.W.I.A., especially when it was clear that the UK was to set up a United Kingdom Wool Marketing Board. However, there was opposition from crofters who did not trust the intentions of the promoters of the scheme, and from spinning mills and Shetland wool merchants based in mainland Scotland who were concerned about the potential impact on their business.[17]

Shetland did not have a spinning mill on the Islands for the most part of the 20th century. Various proposals were put forward and, in some cases, administered but without success. (A spinning mill, however, was set up by a family-run business in 1981 that is still going today.) Therefore, it had become a well-established practice for Shetland manufacturers to send their raw material to a small group of specialized spinning mills based on mainland Scotland. It had become accepted knowledge for some manufacturers to spin Shetland wool as a mix with other wools either for technical or commercial reasons.[18] This practice was hard to monitor as there was no certification in place to reveal the different percentages of wool used in the yarn. The spinning mills were also buying up the wool for their own use. In April 1950, The Shetland Times published an article covering an enquiry into the feasibility of the Shetland Association. It reported that a spinner on the Scottish mainland was asked to disclose the percentage of Shetland wool that was used in the Shetland tweed they produced. The spinner refused, calling it a trade secret.[19]

The Shetland wool quality before being spun was already coming from two variations of sheep: Shetland and Shetland-Cheviot cross. However, there were tweed manufacturers that assured their customers, through their marketing material, that they were weaving with pure 100% Shetland wool. Reports are unclear as to the extent of

this or whether a Shetland mix (bred or spun) was more prevalent. What is clear is that there were differing opinions amongst the Shetlanders and mainland spinners about the qualities of pure Shetland wool spun for use in tweed.[20]

Despite these complications there was confidence in the future of Shetland tweed. Although a small industry, it had been selling successfully to the American market as well as to Europe and the UK since before WW2.

Shetland tweed production featured prominently in post war trade reports as a key asset in the reconstruction plans for both employment and export sales. In one draft written by the Woollen Industry Sub-Committee of the County of Zetland Post-War Reconstruction Committee, it is suggested that:

'To develop the weaving of modern tweeds on an extensive scale, crofters and others should be encouraged, with financial assistance where necessary, to install hand looms…. with a view to stimulating greater interest in weaving and experienced weavers should be appointed to give demonstrations….. Such looms should be provided in large schools throughout the area, and competent instruction given…'[21]

In another report commissioned by the Government, and conducted by textile expert Hiram Winterbotham, there was praise for the tweed:

'The quality and design are excellent and…this branch of the industry is capable of considerable expansion given capital.'[22]

The Calder Report also noted that:

'The weave industry, more than (the) others, appears to have been successful in entering fashionable markets here and abroad. Several individuals are planning to expand tweed production in Shetland after the war'.[23]

The report goes on to say that the weave industry, though small, had plans to buy 50 more looms. It cautioned that this expansion alongside the knitting industry would exhaust the supply of raw material. Further expansion again could mean that tweed products would have to be made with either a Shetland wool mix or another type of luxury yarn as long as production remained on Shetland.[24] Yet again this highlighted the absence of a trademark and interestingly hinted at the criteria that might define modern Shetland tweed, which could have bought it in line with the criteria adopted by the Harris tweed industry.

In 1947, the SWIA was reinstated, and a renewed effort was made to implement the trademark. This time it was proposed that separate marks be allocated to different categories of woollen products. In the case of 'woven articles the words "Shetland Hand Made" and "Woven in Shetland" were suggested for hand and power loom work respectively'.[25] Once again there was scarce support though some manufacturers did adopt the labelling. It was not until 1957 that with perseverance, the SWIA finally succeeded in implementing the trade marks with more precise wording on the labels to indicate the manufacturing processes. The trademarks for woven goods were the first to be introduced, having been registered in October 1956, with the wording as: 'Hand

woven in Shetland', (for tweed and rugs) and 'Made in Shetland' (for products of hand operated machines).[26] The criteria specified the quality of Shetland wool used, the quality of the yarn spun: pure or mixed, and the level of craftsmanship to standardise the woollen products.

'For the award of the trademark, the Association (SWIA) demands to see a sample of the yarn used in the garment or tweed; a sample of the Shetland wool used in the yarn; a sample of the other wool used, for some types of wool will not blend with Shetland to give a satisfactory yarn; and finally the actual garment or a sample of the tweed. The Association demands that the yarn used in tweed shall contain at least 50% pure Shetland wool.'[27]

By mid-1957 the industry suffered another setback. The USA introduced a quota on the importation of high graded worsted products, in an attempt to protect its woollen industry. This affected manufacturers significantly as the USA had become the main market for Shetland tweed. Production dropped dramatically and jobs were lost. Up until this point the tweed industry had an estimated turnover of £200,000 per annum. The timing was particularly unfortunate as the trademark had been well received by American wholesalers and agents who had always been strong supporters for the need for one.[28] This event didn't stop the production of tweed or end trade with USA but it did represent perhaps the greatest lost opportunity for expansion of the tweed industry.

Much effort was made by dedicated Shetlanders throughout the 1950s and into the 1960s to standardise, stabilise and expand tweed manufacture. There were five well established factories trading in tweed products and all on an international level. Each had found their own niche in the marketplace. Sales were made via mail order or through agents involved in the fashion and tailoring business. Shetland tweed received good press and had its fair share of exposure in the fashion pages of newspapers and magazines[29]. However, by 1969 the industry was showing signs of stagnation. There was no outside investment, no modernisation of manufacturing systems, nor a strong marketing strategy to move the industry forward. The turnover of tweed production by 1968 was estimated at approximately £100,000 per annum, which was only about 12% of Shetland's total turnover across all woollen goods.[30] The SWIA's influence had diminished again and the trademarks, it worked so hard to implement across all woollen goods had lost their relevance. The Shetland Knitwear Manufacturers Association superseded the SWIA at this time too because the manufacture of knitted goods was undoubtedly the predominant woollen trade.[31] Tweed continued to be produced throughout the 1970s, 1980s and into the 1990s by a much reduced industry, selling to a dedicated market. The advent of the oil business in the 1970s changed dramatically the dynamics and fortunes of Shetland and this had an impact on employment across the woollen industry. The manufacturers were unable to compete with the wages that could be earned in the oil business.

What of the tweed itself, which had an established market for over 70 years? Its handle, different from other tweeds, gave it a soft, spongy, semi-felted appeal. It was light and comfortable, providing ease of movement. Its breathability gave warmth in cool weather and coolness in hotter weather. It generally came in three different weights: lightweight,

standard and coat weight. These weights would have covered for example: women's light tailored suits, men's sports jackets, and mid-season coats. Manufacturers who produced both knit and tweed could provide for the prevalent trend in the 1950s and 60s to match a tweed skirt and jumper all in Shetland wool. Some of the spinning mills became more skilled at producing finer and finer yarns. In the 1960s one of the products that resulted from these finer weights was Shetland wool ties to finish off a tailored outfit.[32]

Scottish tweeds in general are known for their variety of colour combinations in the warp and weft within a simple twill structure. The many variations on the twill have produced well-known patterns like the herringbone, dog's-tooth, birds-eye and check. Shetland manufacturers were able to interpret these patterns, and many more, in a manner unique to the Islands due to the unusual breadth of natural shades that the wool had to offer. It ranged from beiges and rusts through to very dark browns, a number of shades of grey and white. All these colours are known by their specific Shetland names, such as moorit, shaela and sholmit. The natural colour pallet was augmented by other dyed colours, giving a full range to work with. In the early part of the 20th century the colours were basic; pale blue, bottle green, pink, yellow, navy and black were used. Over time the colour ranges became more extensive. The tweed patterns, therefore, were constructed with either all natural shades or natural shades combined with highlights and blends of colour. These colour and shade combinations became more sophisticated and subtle into the 1950s and 1960s. The effect on the tweed patterns gave great depth and complexity to the simplest of structures. These tweeds evoke Shetlands' woollen heritage through the unique combination of the wool, the natural shades and the individual Shetlander's disposition to develop patterns. [33]

Shetland had a significant tweed industry during the 20th century that should be acknowledged and remembered. It was undoubtedly a victim of diverse and unpredictable circumstances both economically and politically; however, tribute should be paid to those who worked hard to maintain production during this time. Their knowledge and understanding can be traced through the tweeds left behind. Their collective experience of many years and many thousands of hours of work combined to produce a light complex fabric of great refinement. It is to be hoped that the tradition of making tweed in Shetland could re-emerge on a larger scale again at a time when economic circumstances are be more favourable. If this is to happen, then the skills and knowledge need to be recorded and the tradition practiced at some level. In this way the tweed could be re-evaluated for the 21st century. The luxury market is as strong today as it has ever been, and tailoring is still a key part of a fashionable wardrobe. The qualities of a modern Shetland tweed could suit today's lifestyle of mobility, leisure and urban living as it once did so successfully all those years ago.

References and Notes.

1. elevnthdoctorcostume.blog.co.uk/2011/05/good-news-keeps-coming

2. www.wbill.co.uk

3. D.I. Jenkinson, 'The Shetland Woollen Industry- an economic geography', unpublished B.A thesis, University of Liverpool, 1959, p.21

4. D.R. Christie, Lecture on, 'Scottish Tweeds: four hundred years in fashion', International Wool Secretariat, format book, 1958, p.2

5. J. Macleod, 'www.harristweed.org/about-us/index.php - History and Heritage/Lady Dunmore', March 4th, 2013.

Lady Dunmore was born Catherine Herbert. She married Alexander Murray, Viscount Fincastle, later the 6th Earl of Dunmore and proprietor of the Isle of Harris. She became a widow in 1845 and subsequently inherited the Hebridean island.

6. www.harristweedandknitwear.co.uk/faqs

7. www.harristweed.org/about-us/index.php - History and Heritage

8. www.harristweed.org/about-us/index.php - History and Heritage

9. J.M.Cohen, 'Shetland Islanders hope trade mark plan will standardize quality of wool products.' Daily News Record, 18th May 1957

Quote: "R.A. Anderson, vice-chairman of the Shetland Woollen Industries Association…..summed up the problem this way: "We are faced with maintaining a double standard of quality. Most local woollen trades- like the Harris Tweed people- have only to concern themselves with standards of manufacture. We must maintain our standards of manufacture and in addition maintain the standards of the raw material and spun yarns."

10. Jenkinson, 'The Shetland Woollen Industry', p7

11. Hiram Winterbotham, 'Report on the Woollen Industry of Shetland', 1955, p.3

12. Prophet Smith 'Shetland Sheep and Shetland's Woollen Industries, part 2', Wool Knowledge, Spring 1959, p16

13. Smith, 'Shetland Sheep and Shetland's Woollen Industries, part 2', p16

14. Highlands and Islands development board, 'Planning for Progress: Shetland Woollen Industry Special Report 4', April 1970, p6, paragraph 11

15. Smith, 'Shetland Sheep and Shetland's Woollen Industries, part 2', p15

16. Scottish Council for Development and Industry, 'Report on the Woollen Industry in the Highlands and Islands', (The Calder Report), 1946, p35, paragraph 80

17. Prophet Smith ‘Shetland Sheep and Shetland’s Woollen Industries, part 1’, Wool Knowledge, Winter 1958, p17

18. Cohen. ‘Shetland Islanders hope trademark plan will standardize quality of wool products.’

Quote: ‘The difficulties of maintaining the purity of “pure Shetland wool” are many. For example, recently one of New York’s largest department stores came here looking for pure Shetland tweed for use in men’s sports coats. The price quoted was too high, so the buyer asked the manufacturer to produce some “Shetland type” cloth made from crossbred wools at 3 shillings (42 cents) a yard cheaper than pure Shetland.”

19. Shetland Times, ‘Wool Enquiry second day’, 14th April 1950

20. The Calder Report, p34, paragraph 78

21. Zetland County Council, ‘Draft Memorandum prepared by the Woollen Industries Sub-committee of the County of Zetland Post-War Reconstruction committee in response to a request by the Crofter Woollen Industry Committee of the Scottish Council on Industry’, 1947, p5

22. Winterbotham Report, p.4

23. The Calder Report, p35, paragraph 79

24. The Calder Report, p42, paragraph 104

25. Zetland County Council, Draft Memorandum, p1

26. The Shetland News, ‘Trademarks for Shetland Hosiery and Tweed. Success Achieved After Prolonged Fight, Gratification Expressed by Town Council’, Tuesday, February 19th, 1957

27. Jenkinson, ‘The Shetland Woollen Industry’, p11

28. The Shetland News ‘U.S. Tariff and Woollen Industry’, Tuesday, 27th August 1957

29. Style Magazine, ‘Handwoven Tweeds’, No. 15, issued 30th March 1967

30. Highlands and Islands development board, ‘Shetland Woollen Industry Special Report 4’, p85, paragraph 82

31. Highlands and Islands development board, ‘Shetland Woollen Industry Special Report 4’, p56, paragraph 57

32. Daily News Record, New York, ‘Neckwear opens fashion doors’ Tuesday 14th March, 1966, Quote, “Shetland has been around for a few seasons now, and each year it gets bigger. This one, with unfinished tip is by Rivetz (T.M.Adie & sons product).

33. Shetland Tweed archive collection donated by T.M.Adie & Sons, stored at the Shetland Museum, Lerwick.

Appendix B

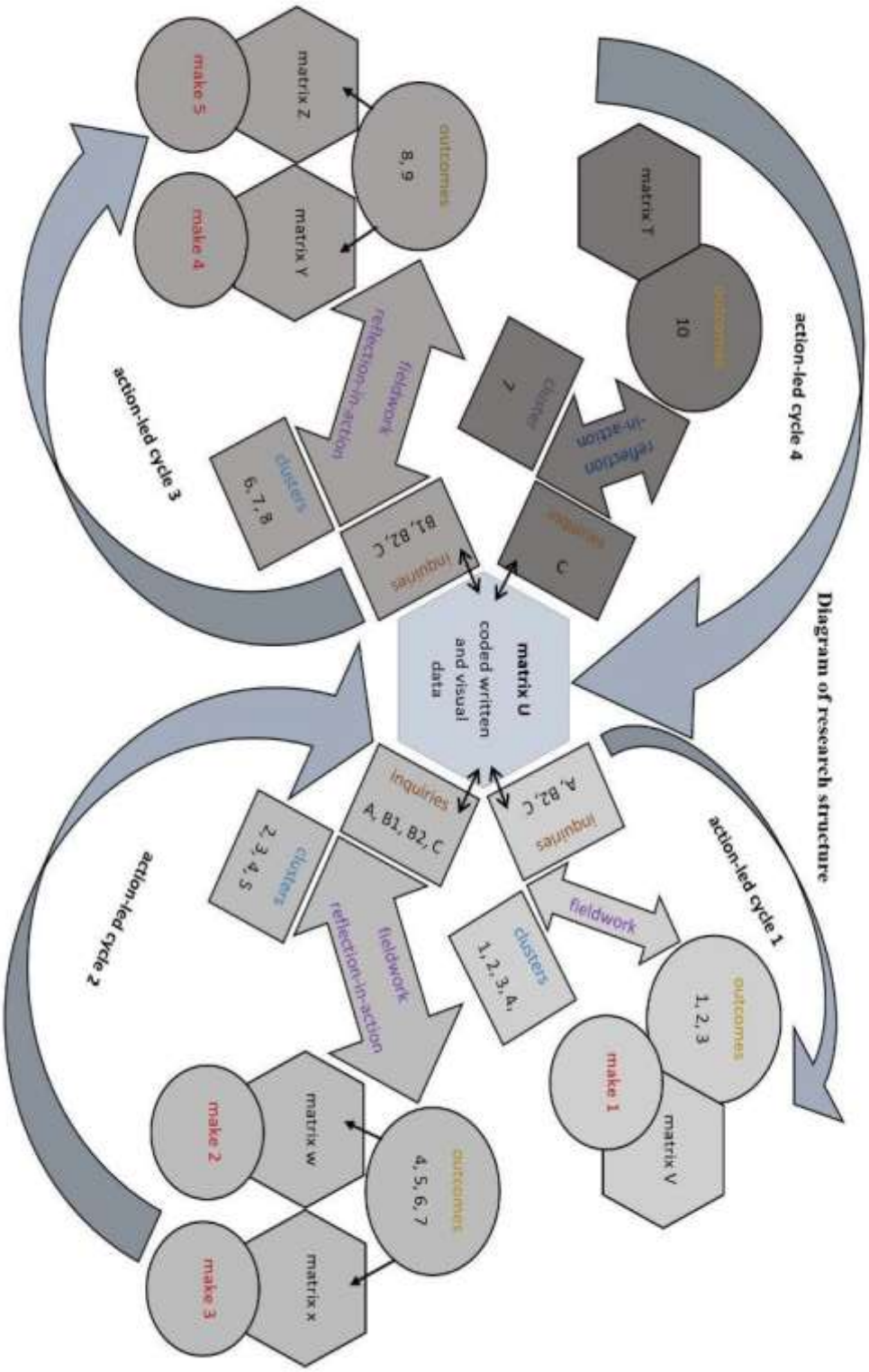


Diagram of research structure
action-led cycle 4
matrix T
outcomes
10
reflection-in-action
cluster
7
inquiries
C
action-led cycle 3
reflection-in-action
fieldwork
clusters
6, 7, 8
inquiries
B1, B2, C
make 5
matrix Z
outcomes
8, 9
make 4
matrix Y
matrix U
coded written and visual data
action-led cycle 2
inquiries
A, B1, B2, C
clusters
2, 3, 4, 5
fieldwork
reflection-in-action
clusters
1, 2, 3, 4,
fieldwork
inquiries
A, B2, C
action-led cycle 1
outcomes
1, 2, 3
make 1
matrix V
make 2
matrix W
outcomes
4, 5, 6, 7
make 3
matrix X

Appendix C

Exposition of the practical work set up in the author's studio

left to right view 1

front view 2

right to left view 3

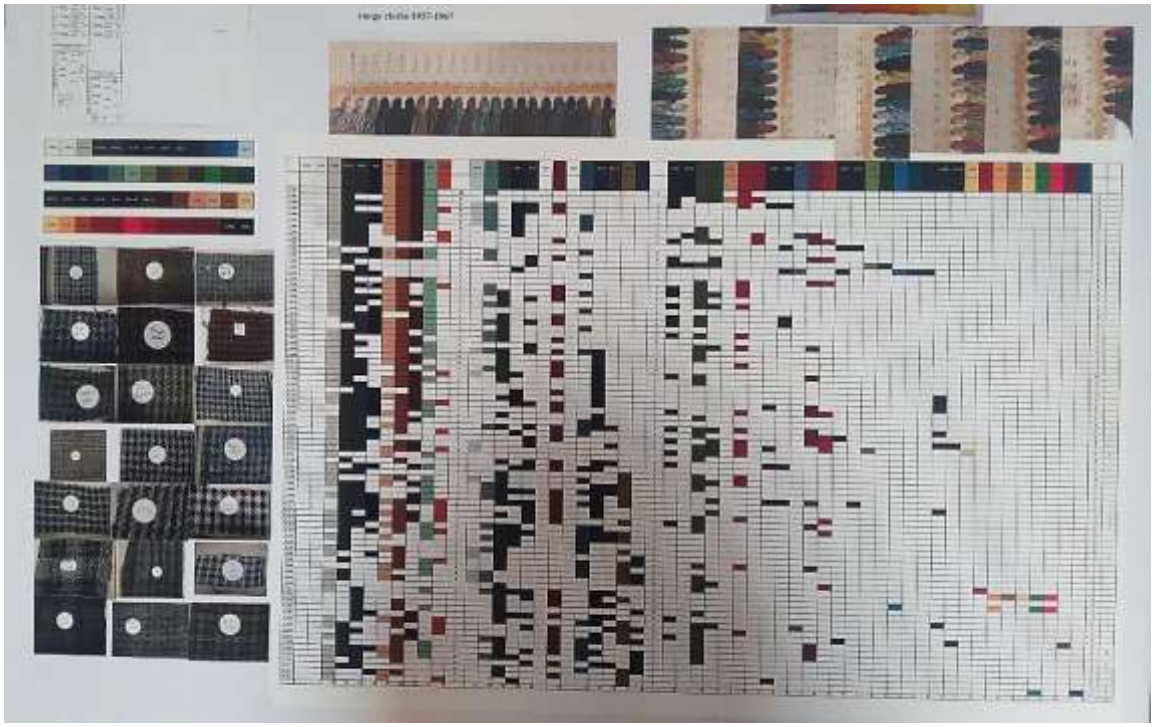
close-up 1: visual documentation as a reference tool: CAT 1, CAT 7, CAT 8, CAT 9

close-up 2: make 1/ wool blending and shading

close-up 3: make 3/ discarded and dilapidated

close-up 4: make 4/depth in the landscape

close-up 5: make 5/ highlighting, contrasting and depth



Close-up 6: Matrix T/inquiry ‘C Archives TMA’ use of colour 1957-1967

Appendix D

1) Ethics Statement that acknowledges the interviews that were conducted with James Adie (nephew to T.M. Adie and production manager of T. M. Adie & Sons tweed from 1946 till doors closed in 1992) between 2011 and 2012 which contributed towards the research for this thesis as well as a book chapter in 'Shetland textiles 800 BC to present day'edited by Sarah Laurence.

Ethics statement: Sarah Dearlove

The part-time PhD candidate commenced in October 2010. At that time there was not a formalised ethics approval process in place within the School of Textiles and Design.

During fieldwork (2012) the candidate wrote a book chapter on case studies using the PhD participant as subject and he was identified in the chapter.

The candidate has emails from the participant agreeing to take part in the interviews for the candidate's research for her thesis research.

During the interviews other members of the participant's family were present on occasion. Thus the family are aware of his consensual involvement.

Since the interviews he has passed. As a result the candidate cannot confirm agreement to his being named in the text.

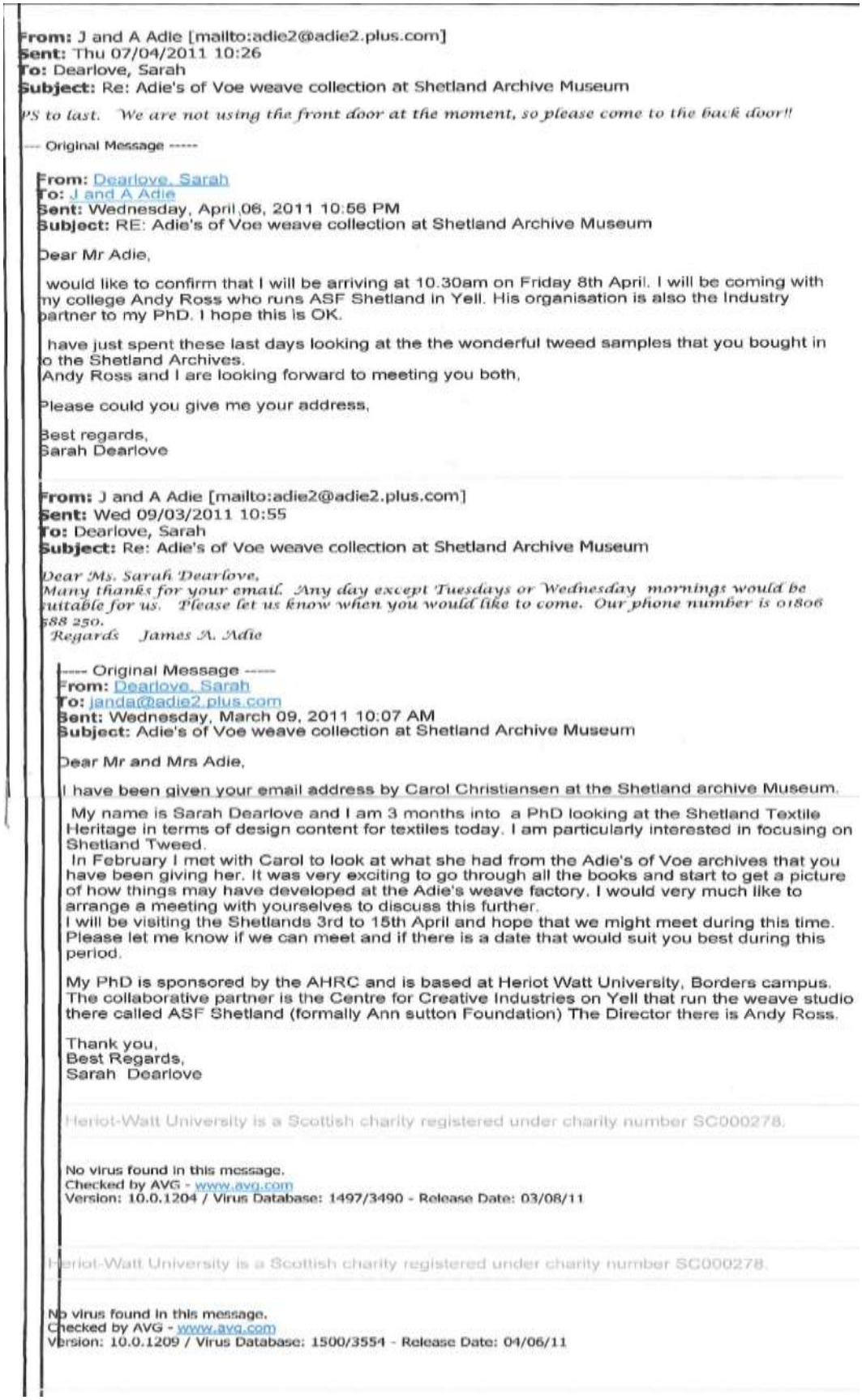
It could be argued in the absence of an official ethics approval process when data collection commenced that there is evidence of adherence to custom and practice in this field of study: the candidate working together with the participant and the expectation of the participant of being identified.

Furthermore the candidate of is of the opinion that the participant is so well known in his craft on the small island community where the research was conducted that other crafts persons would identify him promptly even if standard conventions were used to anonymise his contribution.

It is therefore acknowledged that although the current ethics approval process was not followed, the candidate with available information has shown due diligence in the absence of an equivalent approval system when data collection commenced.

Dr Sue Thomas
Ethics Officer, School of Textiles and Design.
06.11.2019

2) The email correspondence that confirmed the first of the three intervews conducted with James Adie.



From: J and A Adie [mailto:adie2@adie2.plus.com]
Sent: Thu 07/04/2011 10:26
To: Dearlove, Sarah
Subject: Re: Adie's of Voe weave collection at Shetland Archive Museum

PS to last. We are not using the front door at the moment, so please come to the back door!!

--- Original Message -----

From: Dearlove, Sarah
To: J and A Adie
Sent: Wednesday, April 06, 2011 10:56 PM
Subject: RE: Adie's of Voe weave collection at Shetland Archive Museum

Dear Mr Adie,

I would like to confirm that I will be arriving at 10.30am on Friday 8th April. I will be coming with my college Andy Ross who runs ASF Shetland in Yell. His organisation is also the Industry partner to my PhD. I hope this is OK.

I have just spent these last days looking at the the wonderful tweed samples that you bought in to the Shetland Archives.
Andy Ross and I are looking forward to meeting you both,

Please could you give me your address,

Best regards,
Sarah Dearlove

From: J and A Adie [mailto:adie2@adie2.plus.com]
Sent: Wed 09/03/2011 10:55
To: Dearlove, Sarah
Subject: Re: Adie's of Voe weave collection at Shetland Archive Museum

Dear Ms. Sarah Dearlove,
Many thanks for your email. Any day except Tuesdays or Wednesday mornings would be suitable for us. Please let us know when you would like to come. Our phone number is 01806 588 250.
Regards James A. Adie

----- Original Message -----
From: Dearlove, Sarah
To: janda@adie2.plus.com
Sent: Wednesday, March 09, 2011 10:07 AM
Subject: Adie's of Voe weave collection at Shetland Archive Museum

Dear Mr and Mrs Adie,

I have been given your email address by Carol Christiansen at the Shetland archive Museum.

My name is Sarah Dearlove and I am 3 months into a PhD looking at the Shetland Textile Heritage in terms of design content for textiles today. I am particularly interested in focusing on Shetland Tweed.
In February I met with Carol to look at what she had from the Adie's of Voe archives that you have been giving her. It was very exciting to go through all the books and start to get a picture of how things may have developed at the Adie's weave factory. I would very much like to arrange a meeting with yourselves to discuss this further.
I will be visiting the Shetlands 3rd to 15th April and hope that we might meet during this time. Please let me know if we can meet and if there is a date that would suit you best during this period.

My PhD is sponsored by the AHRC and is based at Heriot Watt University, Borders campus. The collaborative partner is the Centre for Creative Industries on Yell that run the weave studio there called ASF Shetland (formally Ann sutton Foundation) The Director there is Andy Ross.

Thank you,
Best Regards,
Sarah Dearlove

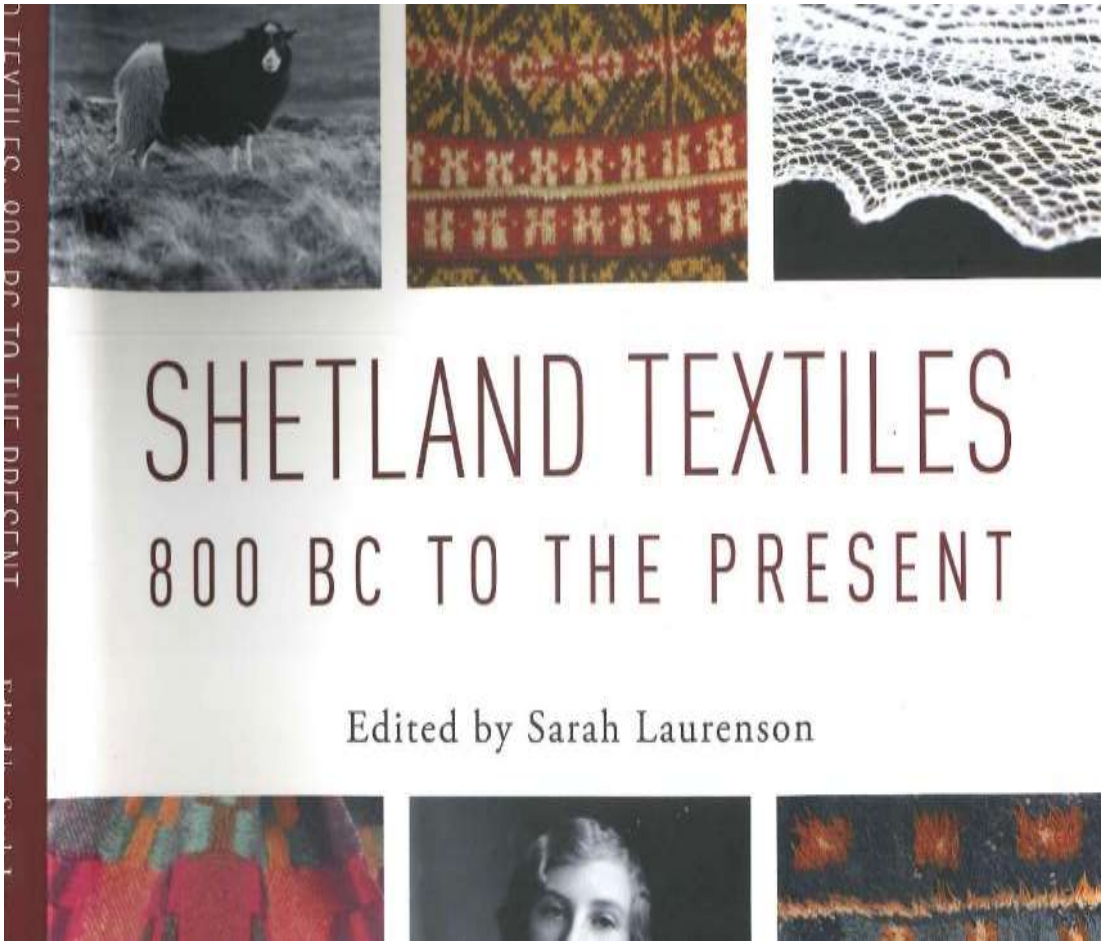
Heriot-Watt University is a Scottish charity registered under charity number SC000278.

No virus found in this message.
Checked by AVG - www.avg.com
Version: 10.0.1204 / Virus Database: 1497/3490 - Release Date: 03/08/11

Heriot-Watt University is a Scottish charity registered under charity number SC000278.

No virus found in this message.
Checked by AVG - www.avg.com
Version: 10.0.1209 / Virus Database: 1500/3554 - Release Date: 04/06/11

3) The front cover to the book and the contents page showing the chapter on Shetland tweed in the 20th century with a page on T.M. Adie & Sons tweed.



4) This is the page in the book on T.M.Adie & Sons

T. M. ADIE & SONS LTD.

James and Anne Adie with Sarah Dearlove

The Museum Store in Lerwick holds the most complete Shetland tweed collection by T. M. Adie & Sons Ltd. It was donated by James and Anne Adie after they retired in the early 1990s. This family-run business in Voe started in the 1830s selling flour and groceries. It developed into a general merchant's shop and then into fishing and curing. During the twentieth century it was running all relevant local concerns: fishing, farming, local shop, tweed, hosiery and bakery.

This tweed collection represents a fascinating history of textile development spanning about 100 years. It starts in the 1890s with samples of hand spun Shetland wool, hand woven into basic tweeds. These lengths of cloth would have been brought to the Adie shop by the crofters as bartering for groceries. The collection finishes in the early 1990s having provided machine spun and hand and machine woven cloths of sophisticated tweeds, using pure Shetland wool and developed for an international, luxury, tailoring and fashion market.

A unique aspect of the Shetland wool used in these tweeds is its soft and light texture expressed through a variety of woven structures and fabric finishing processes. This is exemplified in the kind of names given to some of these qualities: lightweight, special lightweight and featherweight. The natural Shetland wool shades are seen in all the designs, often as a backdrop to enhance the colours, creating a vibrancy and depth to the patterns. This interpretation of classic Scottish tweeds, juxtaposing the qualities with the colour combinations, gives the woven cloth a definitive Shetland character.

James Adie managed the tweed orders for his uncle T. M. Adie. He started working for the family firm in 1948 after he had spent a year on a weaving course at the technical college in Galashiels. He worked with agents from USA, Europe and Japan. He recalled one famous sales meeting, in the 1950s, with a French agent who introduced him to Christian Dior. He then successfully received an order from Dior for a roll of tweed in a black and white diamond check pattern.

Meticulous records were kept of the firm's yearly trading activities. The T. M. Adie & Sons tweed story is succinctly described in a document dated 13 December 1982 entitled 'Notes on the Firm': 'The tweed reached a peak in 1955 with 32 workers making 88,964 yards of single width tweed. Over 90% of this was exported to the United States, but the trade declined when the U.S.A. brought in a quota system to limit the import of the woollen fabrics which were harming U.S. production. In 1983, 3 employees made 4844 yards.'

Despite the limit on imports, the USA continued to be an important market throughout the 1950s, 1960s and 1970s, suggesting that the desire for the Shetland tweeds was heightened because of the minimums put in place. An article published in the *Daily News Record*, New York, in December 1963 shows four examples of Adie tweeds with a caption: 'Hand woven in the Island town of Voe – inspiration behind the sporty country gentleman look. It's traditional – full of character – softness of texture – lighter in tone – quiet heathers enlivened with many rusts and greens. From Thomas Adie and Sons.'

A similar piece was also printed in the Shetland Museum and Archive's monthly newsletter Unkans,

'Dearlove, S. (2012) 'Studying the history of Shetland Tweed', Unkans 34, 4